Office of Environmental Health and Safety

Significant Legislative Rule Analysis
Chapter 246-272A WAC

DRAFT: January 5, 2005

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

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Executive Summary

There are currently more than 800,000 onsite sewage systems (OSS), or septic systems, in Washington State. Between 15,000 and 20,000 new and replacement systems are installed annually. Approximately 30 percent of new homes across the state are built using an OSS. These numbers demonstrate that OSS are increasingly becoming a long-term and important option in wastewater infrastructure planning. However, OSS, if improperly located, designed, installed, operated or maintained, can adversely impact public health and environmental quality. Failing OSS also have economic impacts including potential reductions in property values and adverse effects on industries dependent on good water quality.

The State Board of Health (SBOH) sets minimum standards for the design, installation and operation of OSS to prevent these risks. The rules containing these standards, chapter 246-272 WAC, were last revised in 1995. Since that time, technology has changed and understanding of the treatment capabilities of soil has increased. These advances in our understanding help to increase the life of OSS and decrease the number of failures and the public health risks associated with failures. The rules need to be revised and updated to reflect these advances.

The proposed rules are based on recommendations by the Rule Development Committee (RDC), a stakeholder group including industry consumers, regulators, developers and environmental representatives. The Department of Health (DOH) modified the RDC's initial recommendations based on input received through workshops and public comment. The Department of Health's final recommendations to the SBOH include changes to the current rules in the following categories:

- **Product registration.** DOH maintains a list of products that meet public health standards. Products must be registered with the state before they can be used by designers or allowed by local health jurisdictions. These new sections will place in rule the specific criteria for this registration that, until now, have been contained in guidance.
- **Technical design, installation and operation requirements for systems designed for fewer than 3500 gallons per day.** Local health jurisdictions implement these portions of the rules as minimum requirements but may adopt more stringent codes to meet local needs. The changes include new requirements for treatment levels, hydraulic loading rates, distribution, use of disinfection, and designing systems to be more assessable.
- **Local planning/Operation and Maintenance (O&M).** The proposed rules require local health jurisdictions to write a plan for how and where OSS will be used in their jurisdictions. In addition, owners are responsible for assuring a complete inspection of their system every three years, as opposed to only checking the solids in their septic tank. Certain systems will be required to have an annual inspection.

The purpose of this document is to fulfill the requirements of RCW 34.05.328, primarily to demonstrate that the benefits of the proposed changes outweigh the costs, considering both qualitative and quantitative costs and benefits.

Different portions of the rule impose costs on different entities although it is likely that most costs will ultimately be borne by homeowners and other system owners.

- **Product registration -** Products must be tested by a certified lab to demonstrate effectiveness in order to be placed on the registered list. Only registered products may be used in the state. Depending on the category of product, this testing will cost $20,000 to $80,000. However, this cost is similar to that incurred under the current guidance-based framework for approval.
- **Technical design, installation and operation requirements -** These costs are difficult to quantify because the requirements are site specific. Some sites will see increased costs while others will see decreased costs. Currently, most new OSS range in cost from $5,000 to $20,000 depending on the limitations and sensitivity of the lot. Overall, the cost of the majority of systems will continue to be within this range.
- **Local planning/Operation and Maintenance (O&M) -** Writing a plan will increase costs for counties with marine shorelines, with some local health jurisdictions estimating a cost of $40,000. The costs for non-marine counties are expected to be much less because their plan requirements are very similar to requirements in the current rules. The expanded requirements for maintenance inspections will result in increased costs for owners with more complex systems. Owners with these more complex systems will need to have an annual inspection as opposed to one every three years. Hiring a professional to perform these inspections is not required by the rules. However, if a system owner decides to hire a professional, these inspections generally cost between $150 and $300.

The primary benefits of these changes are realized through avoiding the costs resulting from inadequate or failing OSS. These include:

- **Waterborne disease outbreaks-** Pathogens in wastewater that can cause serious illness include hepatitis, E coli, typhoid, noroviruses, and cryptosporidium, to name a few. The US Environmental Protection Agency (EPA) estimates 168,000 viral illness and 34,000 bacterial illnesses occur each year as the result of consumption of drinking water from systems that rely on improperly treated ground water. The EPA 2002 Onsite Sewage Manual goes on to cite reports that OSS are the third most common source of ground water contamination.
- **Public health risks and environmental damage from high levels of nutrients (nitrogen & phosphorus)-** Water quality studies around the state show increasing nitrate levels in ground and surface water due, in part, to OSS. The public health concern posed by nitrogen is methemoglobinemia or blue-baby syndrome. Additionally, both fresh and marine waters are susceptible to contamination due to excessive nutrient loading. Reports from the Department of Ecology indicate that Hood Canal, Henderson Inlet, South Puget Sound, Port Susan, Lake Chelan and Lake Roosevelt have been adversely impacted by nutrient loadings.
- **Losses to the commercial and recreational shellfish industry-** The shellfish industry reports that 86 million pounds of shellfish worth $76 million were harvested in 2002 and that recreational shellfish are estimated to bring $35.7 million to Washington's economy annually. These industries, as well as tourism and recreation, depend on clean water in order to thrive. However, the list of shellfish growing areas monitored by DOH that are threatened by pollution has increased from 9 sites in 1997 to 18 sites in 2004.
- **Repairing or replacing poorly designed, installed or operated OSS-** As noted above, an OSS costs between $5,000 and $20,000 and is a significant investment for most homeowners. Therefore, assuring that systems are designed, installed, operated and

maintained properly helps promote the long-term life of OSS, reduces costs due to repairs and replacements, and protects the investment homeowners have made in their property.

Significant Analysis
For Onsite Sewage Systems,
Chapter 246-272A WAC

Background

Prior to the development of the initial State Board of Health (SBOH) rules in 1974, "septic systems" were considered a temporary fix to be used until an area could be sewered. The philosophy was "out-of-site, out-of-mind." If sewage can't be seen or smelled, the septic system must be "working" satisfactorily. Systems were installed so the potential of surfacing was minimized. Little emphasis was given to assuring the sewage was adequately treated prior to its release into the subsoil environment.

Since then, it is increasingly recognized that an onsite sewage system (OSS) is a permanent solution to sewage disposal. Sewers are neither financially viable nor environmentally desirable as the only long-term solution for all locations in the state and country. In addition, the state's Growth Management Act restricts piped sewers outside urban growth areas.

This change in thinking over the past three decades has been evident as the level of detail and requirements in the SBOH OSS rules progressed with major revisions in 1983 and 1995. The results of on-going research, the experiences of local and state governments and private sector professionals, and the increased recognition that inadequate OSS pose risks to public health and the environment were all paramount as regulations were developed and revised. The SBOH has focused on its public health mandate but has recognized that its actions may have significant environmental impacts.

Progression of the rules has also been influenced by a number of other factors, including:

- Legislation in 1977 that promoted the increased use of alternative systems.
- Formation of the Puget Sound Water Quality Authority in the mid-1980s.
- Legislation in 1989 to help address failures and expansions along marine shorelines. This legislation resulted in Washington's first experience with treatment (performance) standards.
- Development of new public domain and proprietary technologies.
- Comprehensive onsite manuals developed by the EPA initially in 1980 and updated in 2002.

The rules adopted by the SBOH in 1974 provided basic requirements to help assure minimum levels of consistency throughout the state. Detail on alternative system approval, soil definitions, horizontal setbacks, and minimum land area was included. During each revision, as awareness of the potential impact on public health and the environment increased, requirements were added. These added requirements pertained to: special requirements for coarse soils, minimum vertical separations, restrictions on the use of cesspools and seepage pits, maximum installation depths, restrictions on the use of beds, soil loading rates, performance standards, required monitoring and maintenance, required planning to help assure monitoring and maintenance for all systems, and areas of special concern.

The SBOH initiated the current rule revision process in February 2002 at the request of the Department of Health (DOH). Reasons for initiating this process included:

- Availability of additional research on OSS
- An update to the EPA onsite design manual
- Legislation that established a statewide designer license administered by the Washington Department of Licensing (DOL)
- On-going concerns for adequately protecting ground and surface water
- Recommendations from an advisory committee established by the DOH to evaluate the current rules and state program
- Recommendations that on-going monitoring and maintenance of OSS must be emphasized more

There is general agreement that OSS do not harm the environment and are protective of public health, if proper quality control is exercised throughout the life of the system.
However, an OSS that is not designed and installed properly, that is not used carefully, and that is not adequately cared for, can and likely will fail. Failure of an OSS can cause a number of public health risks, as well as risks to the environment.

There are currently more than 800,000 OSS in Washington State, with more than 470,000 of these in the 12 county Puget Sound basin. Somewhere between 15,000 and 20,000 new systems are installed annually. Approximately 30 percent of new homes across the state are built using an OSS. The 1990 census indicated that 31 percent of existing structures in the state use OSS.

Because of the large number of existing systems, many which use older technology providing unknown levels of treatment and the number of annual installations, OSS pose a potential risk to public health and the environment. This concern is compounded by the fact that the EPA projects that around 1/3 of the land area in the United States is unsuitable for installing conventional gravity OSS. Because of the number of new homes served by OSS being constructed annually and the number of existing structures and homes using OSS, these rules will affect a large number of property owners.

OSS vary considerably in both complexity and price. A basic system sometimes referred to as a "gravity system" can cost up to $5,000. The most complex system could cost as much as $20,000 or more. This variability in complexity also affects the level of care a system requires.

Brief description of the proposed rules

Chapter 246-272 WAC, *On-site Sewage Systems,* contains the design, construction, installation, operation, monitoring, and maintenance requirements for OSS. Currently, chapter 246-272 WAC regulates all OSS under 14,500 gallons per day. Local health jurisdictions use these rules to oversee OSS with design flows up to 3,500 gallons per day (gpd).

This proposal will eliminate chapter 246-272 and create chapter 246-272A WAC, which will apply only to OSS with design flows of 3,500 gallons and under. Large OSS (those with a

design flow of 3,501 gpd to 14,500 gpd) will be regulated under chapter 246-272B WAC, promulgated by the State Board of Health in November 2003. Revisions to the large OSS regulation are currently being considered in a separate rule making process

In addition to creating a chapter exclusively for systems under 3500 gallons per day, the draft chapter contains proposals in three broad categories:

- Requirements for product registration. DOH maintains a list of products that meet public health standards. Products must be registered with the state before they can be used by designers or allowed by local health jurisdictions. This category will consist of new sections of the rules based on current guidance.
- Technical design, installation and operation requirements for systems under 3,500 gallons per day. Local health jurisdictions implement these portions of the rules as the minimum but may adopt more stringent codes to meet local needs.
- Local planning/Operation and Maintenance (O&M)

The chapter was last revised in 1994 and took effect in January 1995. This current revision is the result of almost two years of effort by a Rule Development Committee (RDC), a committee established by DOH to develop recommendations for rule revisions. Technical input was provided by the Technical Review Committee (TRC), a technically based committee established by DOH to assist in the development of technical guidance under RCW 70.118.110.

Is a Significant Analysis required for this rule?

Portions of this rule (those in **boldface** in the list below) require a significant analysis. DOH has determined that no significant analysis is required for the portions of the rule that are not boldfaced in the list below:

Current	Proposed	Section Title
-00101	-0001	Purposes, Objectives, Authority
-00501	-0005	Administration
-01001	-0010	Definitions
-02001	**-0015**	**Local Management and Regulation**
-03001	-0020	Applicability
-04001	**repealed**	**Alternative Systems**
-05001	**repealed**	**Experimental Systems**
-07001	-0025	Connection to Public Sewer System
New	-0100	Sewage Technologies
New	**-0110**	**Proprietary Treatment Productions – Certification and Registration**
New	**-0120**	Proprietary Treatment Product Registration – Process
New	**-0125**	**Transition from the list of Approved Systems – Treatment Products**
New	**-0130**	**Bacteriological Reduction**
New	**-0135**	**Transition from the List of Approved Systems –**

		Bacteriological Reduction
New	**-0140**	**Proprietary Distribution Productions – Criteria and Registration**
New	**-0145**	**Proprietary Distribution Registration**
New	**-0150**	**Transition from the List of Approved Systems – Distribution Products**
New	**-0170**	**Product Development Permit**
New	**-0175**	**Transition from Experimental Systems Program to Application for Product Registration**
-08001	Chapter 246-272B WAC	Large Onsite Sewage Systems
-09001	**-0200**	**Permit Requirements**
-09501	**-0210**	**Location**
-11001	**-0220**	**Soil and Site Evaluation**
-11501	**-0230**	**Design Requirements – General**
-11501	**-0232**	**Design Requirements – Wastewater Tanks**
-11501	**-0234**	**Design Requirements – Soil Dispersal Components**
New	**-0238**	**Design Requirements to Facilitate O&M**
-12501	-0240	Holding Tank Sewage Systems
-13501	**-0250**	**Installation**
-14501	-0260	Inspection
-14501(3)	**-0265**	**Record Drawing**
-15501	**-0270**	**Operation, Monitoring, and Maintenance – Owner Responsibilities**
-15501(4)	-0275	Operation, Monitoring, and Maintenance – Food Service Establishments
-16501	**-0280**	**Repair of Failure**
-17501	-0290	Expansions
-18501	-0300	Abandonment
-19501	-0310	Septage Management
-20501	**-0320**	**Developments, Subdivisions, and Minimum Land Area**
-21501	**repealed**	**Areas of Special Concern**
-22501	-0340	Certification of Installers, Pumpers, and Maintenance Service Providers
-23501	-0400	Technical Advisory Committee
-24001	-0410	Policy Advisory Committee
-25001	-0420	Waiver of State Regulations
-26001	-0430	Enforcement
-27001	-0440	Notice of Decision – Adjudicative Proceeding
-28001	-0450	Severability
-0990	-0990	Fees

The entire current chapter is being repealed and replaced with chapter 246-272A WAC. However, many sections in the current chapter are merely being relocated in the new chapter without substantive change. Other sections contain changes that are not "significant." These include changes for consistency with land use plans under chapters 36.70 and 36.70A RCW and consistency with designer licensing statutes and rule under chapter 18.210 RCW. Other amendments have been made to clarify the rules or are procedural in nature.

The remainder of this document will focus on those portions of the rule that do require a significant analysis.

A. Clearly state in detail the general goals and specific objectives of the statute that the rule implements.

There are several statutes that provide the basis for general goals and specific objectives implemented by the onsite sewage rules and the proposed revisions to them:

- RCW 43.20 is the primary statue that applies. Subsection 050(2) states: *"In order to protect public health, the state board of health shall:*
  (a) Adopt rules necessary to assure safe and reliable public drinking water and to protect the public health.
  (b) Adopt rules and standards for prevention, control, and abatement of health hazards and nuisances related to the disposal of wastes, solid and liquid, including but not limited to sewage, garbage, refuse, and other environmental contaminants; adopt standards and procedures governing the design, construction, and operation of sewage, garbage, refuse and other solid waste collection, treatment, and disposal facilities;
  (c) Adopt rules controlling public health related to environmental conditions including but not limited to heating, lighting, ventilation, sanitary facilities, cleanliness and space in all types of public facilities including but not limited to food service establishments, schools, institutions, recreational facilities and transient accommodations and in places of work…"
- The same section of RCW 43.20 states that the SBOH is to *"adopt rules for the prevention and control of infectious and noninfectious diseases…"*
- Other statutes specifically refer to other areas of environmental health.
  - RCW 70.90.101 *"…finds that water recreation facilities are an important source of recreation for the citizens of the state. To promote the public health, safety, and welfare, the legislature finds it necessary to continue to regulate these facilities."* Water recreation facilities include natural beaches with artificial boundaries designated for the swimming area. Section 120 instructs the State Board of Health to adopt rules *"governing safety, sanitation, and water quality for water recreation facilities."*
  - RCW 69.30 intends to provide protection for shellfish growing areas. Section 005 specifies, *"Protection of the public health requires assurances that commercial shellfish are harvested only from approved growing areas…"* The State Board of Health is to adopt rules and regulations to protect public health. Section 005

continues, *"Such rules and regulations may include reasonable sanitary requirements relative to the quality of shellfish growing waters and areas, …"*

- In the statute that established the Washington State Department of Health in 1989 (RCW 43.70), there are additional statements that speak to general goals and specific objectives that the onsite sewage rules intend to implement. Section 005 states, *"The legislature finds and declares that it is of importance to the people of Washington state to live in a healthy environment ...The legislature further finds that social and economic vitality of the state depends on a healthy and productive population.… Further, it is the intent of the legislature to improve illness and injury prevention."*

Thus, the general goal of applicable RCWs that apply to the promulgation of OSS rules and any revisions to them is to protect public health by preventing and controlling infectious and non-infectious disease, recognizing the link between public health and economic vitality. In simpler terms, the overriding goal is to protect the health of Washington State's public.

Based on the statutes cited, specific objectives of this rule and the proposed revisions are to protect public health by assuring:

- Safe drinking water from ground water, springs, and surface water sources,
- Clean and safe surface water in which people may recreate,
- Shellfish can be harvested from surface waters not degraded by OSS, and
- The potential of sewage backing up into a residence is minimized.

The onsite sewage rules intend to do this by establishing standards for the proper siting, design, installation, operation, monitoring, and maintenance of onsite sewage systems. Additionally, the rules intend to assure sites are properly evaluated, including identifying the level of protection needed to properly protect a given site before an OSS is installed. Systems must demonstrate the capability of meeting specified levels of protection before they can be used on a site.

In defining the public health protection measures, the rules also intend to satisfy another specific objective noted in another statute:

- RCW 43.70.310 states: *"Where feasible, the department and the state board of health shall consult with the department of ecology in order that, to the fullest extent possible, agencies concerned with the preservation of life and health and agencies concerned with protection of the environment may integrate their efforts and endorse policies in common."* The Department of Ecology had a representative on the RDC. Additionally, meetings including DOH, the Department of Ecology, and the Governor's office were held to help facilitate this integration.

All proposed revisions to the current rules intend to meet the general goal and specific objectives of applicable statutes. Section 0001 of the proposed WAC 246-272A states:

(1) The purpose of this chapter is to protect the public health by minimizing:
(a) The potential for public exposure to sewage from onsite sewage systems;
(b) Adverse effects to public health that discharges from onsite sewage systems may have on ground and surface waters;

(2) This chapter regulates the location, design, installation, operation, maintenance, and monitoring of onsite sewage systems to:
(a) Achieve effective long-term sewage treatment and effluent dispersal; and
(b) Limit the discharge contaminants to waters of the state.

B. Determine that the rule is needed to achieve these goals and objectives, and analyze alternatives to rulemaking and the consequences of not adopting the rule.

Why rule revisions are needed to achieve goals and objectives

Introduction

In 1977, RCW 70.118.010, On-site Sewage Disposal Systems, was passed. It states *" The legislature finds that over one million, two hundred thousand persons in the state are not served by sanitary sewers and that they must rely on septic tank systems. The failure of large numbers of such systems has resulted in significant health hazards, loss of property values, and water quality degradation."* OSS, if improperly located, designed, installed, operated, and maintained, can adversely impact public health and environmental quality. Failing OSS also have economic impacts, including potential reductions in property values and adverse effects on industries dependent on good water quality.

In 1997, the EPA presented a report to Congress regarding decentralized wastewater systems, which includes both individual OSS and OSS serving small clusters of residences or other wastewater sources. This report concluded: ***"Adequately managed decentralized wastewater treatment systems can be a cost-effective and long-term option for meeting public health and water quality goals, particularly for small, suburban and rural areas."*** (EPA, 1997)

This report listed several potential benefits of using properly managed OSS. The benefits included:

- OSS can protect public health and the environment as well as centralized sewers can.
- In areas with low population densities, individual and/or cluster OSS are frequently the most cost-effective wastewater infrastructure option.
- OSS can provide considerable flexibility in system and site selection. Technologies can be readily targeted to:
  - Satisfy varying site conditions, such as shallow water tables or bedrock, high and low permeability soils, and small lot sizes;
  - Satisfy varying sensitivities of receiving environments, such as those overlying unconfined drinking water aquifers, or adjacent to surface water; and
  - Maximize local reuse and groundwater recharge.
- OSS can provide considerable cost savings for both initial capital and on-going maintenance costs.

OSS can provide long-term, flexible, and cost-effective protection of public health and the environment. However, to do so, proper management throughout the life cycle of an OSS

(siting, design, installation, use, care) is absolutely essential. The primary goal of the proposed revisions to WAC 246-272 is to protect public health by providing better assurance that this life cycle management will be done.

In order to determine what requirements should be considered to achieve this goal, it is important to understand the constituents in sewage that cause concern. Some constituents lead directly to potential public health problems, others do so more indirectly. Primary constituencies of concern include:

- Organic material (measured as carbonaceous biochemical oxygen demand – $CBOD_5$) which if not removed can plug system components, increasing the potential of sewage backing up into a structure or surfacing on the ground.
- Total suspended solids (TSS) and oils and greases, which can also plug system components leading to problems.
- Pathogens, such as viral agents, bacteria, and protozoans, which may cause disease if they make their way through a system into ground or surface waste. Pathogens include microorganisms that cause hepatitis, cholera, typhoid, dysentery, giardiasis, and a variety of other well known diseases. Emerging microorganisms that cause illness with which many are not familiar, some of which are chlorine disinfection resistant, including Noroviruses and cryptosporidium. It is practically and economically unfeasible to sample for all organisms of concern. Thus, fecal coliform (FC), bacteria found in the guts of warm blooded animals, is used as an indicator of the presence of pathogens. The higher the number of FC, the greater the risk of pathogens being present.
- Chemical agents, such as nitrogen and phosphorus, can lead to more rapid eutrophication of water bodies and oxygen depletion if they are not properly handled. While phosphorus is not recognized as a public health concern, nitrogen may cause possible pregnancy complications or methemoglobinemia ("blue baby syndrome") a potentially fatal condition in infants.
- Other chemical agents, such as some degreasers and possible chlorine byproducts that may be carcinogenic.

<u>Association between illness and OSS</u>

The primary diseases potentially associated with deficiencies in OSS are 1) enteric infections or diseases from microorganisms that are typically discharged from the gastrointestinal tract, and 2) methemoglobinemia resulting from excess nitrate exposure.

It is nearly impossible to conduct a study or to analyze secondary information to directly demonstrate the public health impacts of poorly designed, installed, operated, and/or maintained OSS. While many enteric infections are notifiable conditions, the majority of these infections are not reported. Many are not even recognized or diagnosed, even if a doctor is visited. Further, the same infections can also be transmitted due to poor hygiene and direct contact (e.g., shaking hands) or poor food hygiene. As such, it is impossible to address whether OSS are associated with an increase in the incidence or prevalence of enteric infections. However, because enteric diseases are associated with fecal contamination, improperly functioning or failing OSS would be expected to increase the potential of these diseases.

Assessing the impact of OSS on the risk of methemoglobinemia is similarly difficult. Although methemoglobinemia is a notifiable condition, very few cases are reported. Factors other than nitrate exposure via water also contribute to the risk of methemoglobinemia. These factors include nitrate in food, diarrhea, age, and the infant's ability to convert methemoglobin back to normal hemoglobin. Given the low frequency of occurrence, poor surveillance, and the importance of other causal factors using such data to address the association of OSS to methemoglobinemia is not feasible.

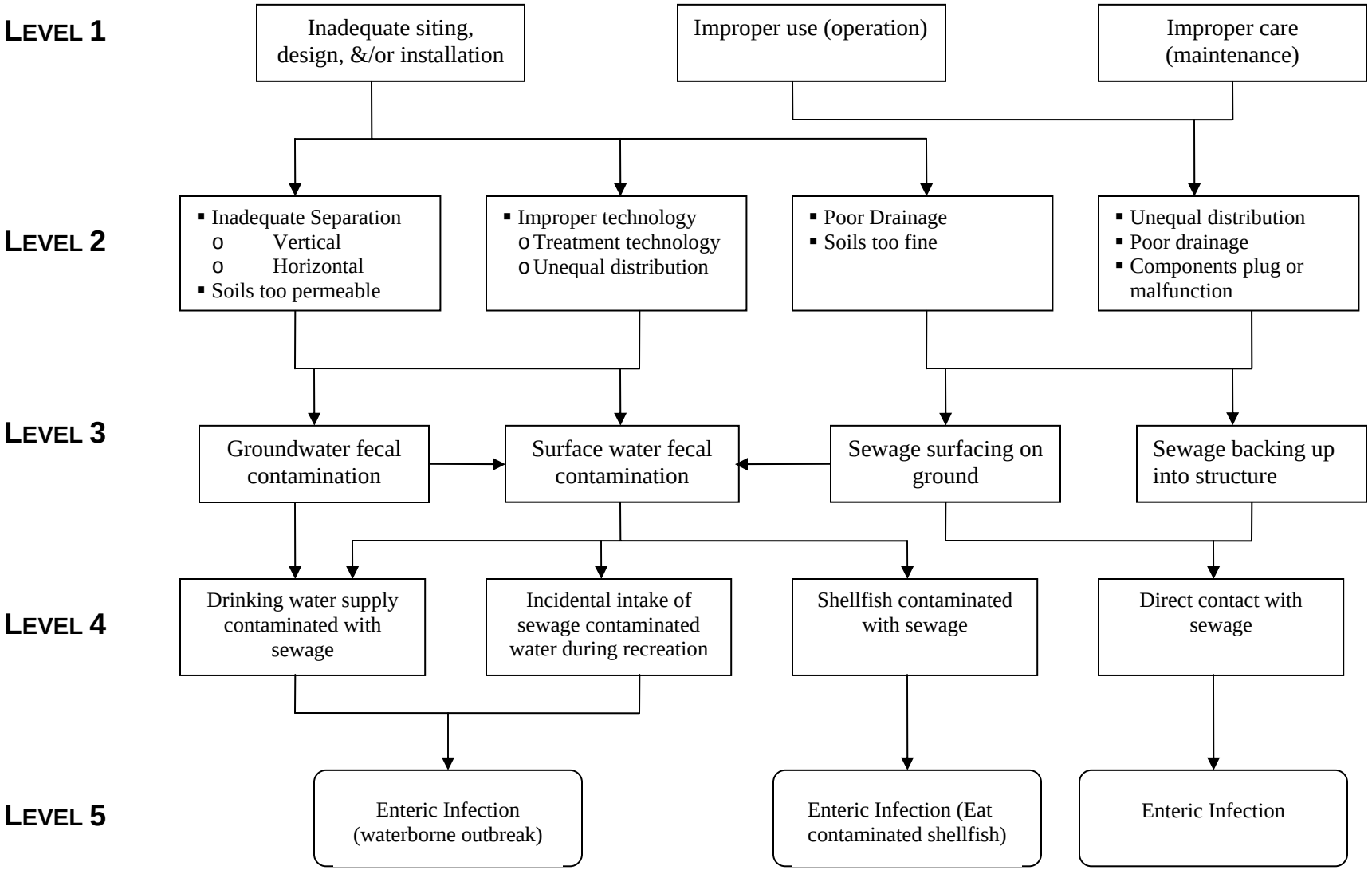
Addressing the public health impacts of OSS - Pathogens

While studies cannot directly measure the association of OSS practices and the risk of disease, the potential impact of poorly designed, installed, and maintained systems is evident. This connection can be made by tracing the chain of events that can lead to people being exposed to contaminants. The connections in the chain of disease transmission are depicted in Figure 1.

There is ample evidence that the effluent from a septic tank may contain very high concentrations of enteric bacteria, viruses, and protozoa. Level 1 in Figure 1 depicts the actions that provide the first link in this chain of transmission. If an OSS is improperly sited, designed, installed, used, or cared for, the conditions noted in Level 2 allow the pathogens to pass through or bypass the soil instead of being removed. This can lead to the results in Level 3, contamination of ground or surface water or sewage surfacing or backing up into structures. These conditions are considered failures.

When a system fails, it creates situations where humans come into direct contact with sewage and pathogens contained in the sewage (Level 4). Drinking contaminated water, eating contaminated shellfish, accidentally ingesting contaminated water while swimming or walking through sewage can and does result in illness (Level 5).

Figure 1. Chain of Disease Transmission for OSS



The connections or links in the transmission of diseases with OSS are real. The risk of disease transmission dramatically increases as more of the conditions noted in Level 2 of Figure 1 are allowed to occur. Barriers (proper soil depth, proper setbacks, proper loading, etc.), as part of public health prevention activities (regulatory requirements, guidance documents, or standards of practice), help prevent the situations in Level 2 in order to break these connections or links. The provision of these barriers is just one of the steps in public health's attempt to provide multiple barriers to the transmission of disease. Other barriers provided include providing treatment to drinking water, restricting shellfish harvesting, or closing beaches.

Addressing the public health impacts of OSS - Nitrogen

Nitrogen is a nutrient contained in human sewage. The same conditions that help remove pathogens (aerobic, unsaturated flow through soil) convert the nitrogen to nitrate. Nitrate is soluble in water and will readily move to ground and/or surface water if there is water in the soil to transmit it. Once nitrate is in ground and/or surface water, it can cause the public health and environmental concerns mentioned previously. Because of this concern, the EPA has established a maximum contaminant level of 10 parts per million (ppm) of nitrate as nitrogen in drinking water. Nitrogen can also be an indicator that other chemicals may be present in the wastewater.

The proposed rules provide three options to help break the links in the chain of transmission needed for increased nitrate concentrations in ground and surface water. These options are:

- Remove nitrogen at the source. In residential sewage most of the nitrogen is in the human waste part of the sewage stream. If human waste can be removed from the sewage effluent before it flows through the soil, little nitrogen will be available to convert to nitrate and contaminate ground or surface water. Proprietary treatment products, such as composting or incinerating toilets, are available through the proposed regulations to provide this option.
- Remove or reduce it in a treatment process. A treatment process that will send nitrogen through the entire nitrogen cycle (convert back to nitrogen gas that can escape to the atmosphere) or place it where it can be used by plants can do this. The proposed rules provide tools for this: a treatment level for total nitrogen and a process for registering proprietary treatment products that meet the treatment level.
- Dilute it with greater volumes of groundwater. The greater the volume of ground water into which treated effluent containing nitrates is flowing, the lesser the concentrations of nitrate will be. This is the primary intent of the proposed increase in minimum land areas in the proposed rules.

Failures and sources of contaminants

The definition of "failure" in the current SBOH rules includes sewage backing up into a structure, surfacing of sewage, and contamination of ground or surface water by sewage. These are all noted in Level 3 of Figure 1. Backing up and surfacing sewage are relatively easy to determine. However, contamination of ground or surface water by improperly treated sewage from an OSS is difficult and expensive to verify. Yet, we do know there are failing systems and

we do know there are water quality problems as a result. The following discussion gives some examples of the kinds of problems being experienced.

Two to 50 percent or more of OSS have been reported to be failing by studies evaluating certain areas within Washington State counties. The 2002 EPA manual (EPA, 2002) cited a 1999 study which reported failure rate estimates from 28 reporting states. The study indicated a 33 percent failure rate was estimated in Washington State, compared to a range of one to 60 percent in the other 27 states. The accuracy of this data is unknown, primarily because 1) no state directly measures its own failure rate and 2) the definition of failure varies considerably. The actual failure rates may be higher than commonly thought because ground and surface water contamination are typically not included in most reports.

The EPA 2002 manual (EPA, 2002) cites a 1996 report in which state and tribal agencies indicate that OSS are the third most common source of ground water contamination. The report concludes that OSS fail due to improper siting, improper design, or inadequate long-term monitoring and maintenance.

Citing various reports, the 2002 EPA manual (EPA, 2002) indicated that states and tribes identified "more than 500 communities as having failed septic systems that have caused public health problems." The discharge of partially treated sewage from malfunctioning OSS was identified as a principal or contributing source of degradation in 32 percent of all harvest-limited shellfish growing areas. (EPA, 2002)

More specific to Washington State, in Kitsap County the most common causes of FC pollution in fresh waters were noted to be agricultural and livestock waste, OSS, pet waste, and stormwater runoff. The county also noted that pollution in marine waters may also be caused by freshwater with high fecal coliform counts flowing into the marine waters, as well as by marinas and related industries and sewage treatment plant outfalls. (Golder Associates, 2003)

Nutrients, such as nitrogen and phosphorus, have also been the subject of numerous studies around the state. Kimsey reports that Hood Canal, Henderson Inlet, South Puget Sound, Port Susan, Lake Chelan, and Lake Roosevelt are water bodies that have been adversely impacted by nutrient loadings, with OSS identified as a major contributor. (Kimsey, 2004) There is agreement that the many OSS along the shorelines are contributing to the problem, though not all interests agree on the level of contribution.

In 1997, as part of its routine monitoring, a public drinking water system in northeast Thurston County was measured to have nitrate concentrations as high as 14.2 ppm. A study performed by the Thurston County Health Department suggested that a primary source of the gradual increase in nitrate concentrations in the water system was the accumulative impacts of OSS in surrounding developments. Most of the OSS consisted of deep trenches installed to reach more permeable soils underlying fine textured soils or glacial till. (Thurston County, undated)

Thus, even though we are unable to state with certainty how many OSS are failing, we do know that ground and surface water quality problems do exist and that OSS play a role in the contamination. Further, we know that this contamination can lead to waterborne disease outbreaks. Examples of such outbreaks are discussed below.

Waterborne disease outbreaks

While we have progressed considerably from the early 1900s when typhoid and other diarrheal and enteric diseases were the third leading cause of death, waterborne disease outbreaks still occur. EPA estimates that 168,000 viral illnesses and 34,000 bacterial illnesses occur each year as a result of consumption of drinking water from systems that rely on improperly treated ground water (EPA, 2002). Worldwide the numbers of both outbreaks and cases is significantly higher. Reasons for the relatively low numbers of outbreaks in the United States are related to standards for OSS, treatment standards for community wastewater systems, treatment of drinking water, and vaccination programs. Even though the number of outbreaks is low, the risk is real.

To depict how easily a public health concern can develop, during the 1970s, there were two small outbreaks of typhoid in Washington State. Both outbreaks resulted from pathogens being discharged from a simple "septic system" into coarse soils. The coarse soils did not remove the pathogens. Individuals drank water from a shallow well several hundred feet down stream and became ill. Steps were not taken to assure the site's sensitive conditions were matched with a system providing levels of protection commensurate with the site's sensitivity, nor were steps taken to assure safe, potable water.

Other disease outbreaks where sewage has been a suspected contributing cause include:

- 1982 in Black Diamond, Washington – 3 cases of giardiasis – cause may have been septic tanks which flooded lawns after heavy rainfall and flowed into nearby creek. (DSHS, circa. 1985)
- 1986 in a South Dakota campground – 135 cases of illness (Norovirus) caused by a septic system uphill from the water supply (EPA, See web link)
- 1990 in Sedona, Arizona – 900 cases of illness (Norovirus) caused by a sewage treatment plant discharge inadequately treated sewage to shallow soils overlying coarse soils and an aquifer 400-600 feet deep. (EPA, See web link)
- 1992 in Racine, Missouri – 46 cases of hepatitis A caused by a nearby septic system draining into an excessively coarse soil (EPA, see web link)
- 1999 in Washington County, New York – at least 781 cases of illness (E. Coli 0157:H7 and Campylobacter) with two deaths with one cause being sewage from a seepage pit contaminating a well. (New York State Department of Health, 2000)
- 2003 in Samish Bay (Whatcom County), Washington – at least 25 cases of illness consistent with viral gastroenteritis, possibly Norovirus. Potential sources included two septic tank systems. (DOH, 2004)

Fortunately, in large part because of the current regulations, such outbreaks are relatively rare. We now recognize the potential threat and have technologies available that can provide needed treatment. OSS are being located, designed, and installed with higher levels of quality control.

However, there are a number of areas where needed improvements have been identified. For example, insufficient attention has been given to assuring proper monitoring and maintenance of OSS. Also, research has provided a new understanding of treatment technologies and the ability of soils to distribute and treat effluent since the last time the rules were revised. In order to fully

realize the goals and objectives of the statutes guiding onsite sewage policy, revisions to update the rules are necessary.

Alternatives to Rulemaking

The alternative to rulemaking would be to not adopt new rules but leave the current rules in place. DOH could attempt to change practices through guidance documents and education targeted to industry professionals, local health jurisdictions and system owners. However, DOH believes these options will not sufficiently protect public health. The consequences of not adopting rules are discussed below.

Consequences of Not Adopting the Rules
The consequences of not adopting the rules are different for the three categories of changes:

Product Development and Registration

The current rules require products to be on the DOH list of approved products, but do not include the process for approval. The proposed rule establishes a process for proprietary product registration, the first time the process has been detailed in rules. Prior to this proposal, these criteria were in guidance. The department faced lawsuits because a detailed, consistent methodology for testing protocol and administration was not provided in rules. Unless these criteria are placed in rule, the DOH registration of proprietary products will be discontinued based on the inability to enforce the criteria as guidance**.** This would add to the problems faced by local health jurisdictions and manufacturers. They would not have a centralized, efficient process to use and follow. Also, designers would not have a list from which to select technologies. They would have to go through detailed analysis of all the options themselves and carry the burden of recommending products to their clients that have not been reviewed by any regulatory authority.

Technical Requirements for Design and Installation

These rules were last revised during the early 1990s and became effective in 1995. Since then OSS technology has evolved considerably. There is greater understanding of how the soil treats sewage. Many proposed technical changes dealing with the design and operation of OSS are adjustments to existing standards reflecting technological advancements and creating consistency with EPA guidance. While many of the changes are small and incremental, they work together in a comprehensive way to provide increased public health protection.

One consequence of not adopting the rules will be the continued use of outdated standards and some technology for designing and installing OSS, putting the public's health at increased risk. For example, outdated standards, such as those that allow the use of untested, add-on disinfection technology, create considerable concern and need to be changed. A number of the existing requirements are not consistent with the results of current research and EPA manuals and need to be updated to provide better assurance that OSS can have more predictable performance and provide more consistent protection of public health and environmental quality.

Local Management and Planning

The current rules require local health jurisdictions to develop and implement plans to monitor all systems, disseminate O&M information, and provide education to homeowners. However, the plans do not need to be in writing nor approved by the local board of health. The local planning, management, and operation and maintenance portions of the proposed rules require local health jurisdictions in marine shoreline counties to take a comprehensive look at their jurisdiction's wastewater infrastructure needs and develop the necessary information that will assist them in their long-term planning. Other local jurisdictions must develop a lesser plan, one that requires somewhat less than is required in current rules.

If the proposed rules are not adopted, counties, at least in marine shoreline counties, may not comprehensively plan for the development and management of OSS and may continue to target just O&M rather than focus on a more broad-based planning approach. In addition, the local board of health and the citizenry will not be actively involved for OSS planning in their county.

C. Determine that the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the statute being implemented.

This section of the analysis is broken into two main parts:

- Discussion of the general costs that can occur when a disease outbreak or pollution occurs and the benefit of prevention activities in avoiding these costs.
- Discussion of the changes being proposed in each section of the rules and the specific costs and benefits of each change.

POTENTIAL COSTS OF OUTBREAKS, CONTAMINATION, AND POLLUTION AND BENEFITS OF PREVENTION ACTIVITIES

Potential Costs

When a waterborne disease outbreak occurs or ground or surface water is contaminated, there are a variety of personal and community costs that can occur. This includes costs related to:

- Medical activities – health care for outbreak patients, laboratory cost, epidemiologic studies. As noted previously, with some diseases caused by organisms such as E. coli 0157:H7 are chronic.
- Losses in productivity – sick leave for employees, employees without work, reduced or no business revenue, having to provide credits for recalling products
- Reduction in property values.
- Providing bottled water, connecting to other water supplies, finding and developing a new water supply, if one is available. (Kimsey, 2004)
- Individual homeowner responsibilities – evaluation of systems, system repair, potential reduction in investment value (OSS is part of investment in home or structure).

- Repair or replacement of community wastewater and/or drinking water system components.
- Rehabilitation of water bodies.
- Local economy effects - losses due to reductions in tourism and other business.
- Lawsuits and legal fees.
- Death. In extreme cases, particularly for immune compromised individuals, death is a possible outcome of enteric disease. The United States typically uses a figure of $6 million per death when determining the cost of various events.

A cost analysis is not done for each outbreak that occurs. Following are three cases for which the costs of the outbreak have been studied. Two of the three case studies do not relate to outbreaks that occurred because of failing OSS. The cost information is included to illustrate the wide variety of costs that can result from waterborne disease outbreaks.

- Samish Bay, in Whatcom County, Washington, experienced a Norovirus outbreak in November 2003. (Dewey, 2004) The economic effects of this outbreak included:
  - An estimated combined loss of $130,000 in sales for several shellfish companies.
  - Product recalls from several states resulted in a cost to the firms and an estimated $20,000 in credits being issued.
  - 11 employees were laid off.
  - Local restaurants and retail markets were forced to find product elsewhere.

- A massive waterborne disease outbreak caused by the cryptosporidium organism occurred in Milwaukee, Wisconsin in 1993. Corso and others, with the Centers for Disease Control and Prevention, performed a retrospective study of the costs associated with a massive cryptosporidium outbreak (over 400,000 cases and 200 deaths) due to a contaminated water supply in Milwaukee, Wisconsin in 1993. (Corso, et. al., 2003) The study stated, “The potentially high cost of waterborne disease outbreaks should be considered in economic decisions regarding the safety of public drinking water supplies.” The study concluded:
  - The average cost per person with a serious illness was over $7,800, including both medical and loss of productivity costs.
  - The total cost was over $96 million, including $31.7 million in medical costs and $64.6 million on lost productivity costs (725,000 lost work/school days).

- The 5,000 citizens of Walkerton, Ontario, Canada experienced a severe E. Coli 01 (2,300 cases, many with chronic, lifelong cases; 7 deaths). CBC News reported on a study that was performed to estimate the total costs of the outbreak. (CBC News, 2004) The estimated costs included:
  - Total costs of $64.5 million ($155 million if human suffering is factored in).
  - Each household paid an average of $4,000 (total of $6.9 million) to resolve the problems.
  - Real estate values fell an estimated $1.1 million due to the outbreak.
  - Costs to the community’s business for providing items like bottled water, disinfection equipment, replacement equipment of $651,422.
  - Lost revenues from May 1, 2000 to April 30, 2001 of $2.7 million.

- More than $9 million to fix the community's water system.
- The Province of Ontario spent $1.5 million to supply clean water to institutions and $3.5 million on legal fees.

Washington State is the largest producer of farmed shellfish in the United States. Contamination of shellfish growing waters can have a dire impact, both on public health when contaminated shellfish are consumed and on state and local economies. Tax revenues, industry revenues, and employment can be adversely affected.

- The Pacific Coast Shellfish Growers Association estimates that in 2002 approximately 86 million pounds of farmed shellfish worth $76 million were harvested in the state. (Pacific Coast Shellfish Growers Association, 2004)
- The shellfish industry is the second largest private employer in two of Washington's rural counties, Pacific and Mason Counties, with an estimated annual payroll of almost $28 million for over 1,200 employees. (Pacific Coast Shellfish Growers Association, 2004)
- The Puget Sound Action Team (PSAT) indicates that pollution from a variety of sources, including OSS, has resulted in the closure of over 30,000 acres of commercial shellfish growing areas since 1980. (PSAT, 2004)
- Between 1985 and 2002, 25 percent of the approved commercial shellfish growing areas have been downgraded by the Department of Health. The list of shellfish growing areas threatened by pollution, which is monitored by DOH, has increased from 9 sites in 1997 to 18 sites in 2004. (PSAT, 2004) This forces shellfish growers to grow more shellfish in a smaller area to fill their market demand.

In Washington State recreation and tourism, including activities such as boating, fishing, shellfishing, clamming, beachcombing, and bird watching, contribute to local economies. They also contribute to the quality of life in local communities. Lessening surface water quality of both fresh and waters can have dire impacts on these activities.

- Recreational shellfish provides an economic boost to Washington's economy with an estimated value of $35.7 million. (Dewey, 2004)
- The coastal razor clam fishery generates an estimated $7 million for commercial sales annually, with an estimated additional $12 million injected into local economies from the sport fishery. (PSAT, 2003)
- Around 109 million Americans visited a beach last year. (National Geographic Traveler, 2004) The Natural Resources Defense Council (NRDC) reported that the number of water advisories and beach closures in the United States increased more than 50 percent from 2002 to 2003. They found that 88 percent of the beach closures and advisories in 2003 were attributed to bacteria related to FC. (NRDC, 2004) While there are many sources that contribute to these closures and advisories, one of the major ones being sewage outfalls, OSS can be a contributing factor.
- "Tourism is a vital part of the state's economy and an important economic engine for hundreds of communities and businesses throughout the state. This $11 billion industry supports more than 126,800 jobs and some 30,000 small businesses that provide visitor industry goods and services." (CTED) A healthy public and environment supports a healthy tourism industry.

Benefit

Prevention provides the primary foundation for public health programs. Multiple barriers are typically placed in the chain of disease transmission to prevent waterborne disease outbreaks. An example would be the requirements for OSS that provide adequate pathogen removal (to prevent the situations noted in Level 2 of Figure 1) and disinfection for a drinking water system to disinfect the water prior to use. This means that multiple things must go wrong before a disease is expected.

Reducing or eliminating human exposure to raw or partially treated sewage is a primary tenet of public health prevention programs. Public health programs, including the activities of both local and state health jurisdictions, as well as design, installation, and maintenance professionals, have been increasingly diligent over the past few decades. The result has been fewer waterborne outbreaks due to OSS, a sign of success.

However, outbreaks do still occur. Also, the history regarding shellfish growing area closures provides evidence that water quality is being adversely affected. The effect OSS have on other bodies of fresh and salt water, as well as on groundwater, is not well known. As populations and population densities increase, as ground and surface waters are increasingly stressed, and as new microorganisms emerge, risk increases. Outbreaks and contamination can and will occur if OSS are not designed, installed, operated and maintained diligently.

Thus, the primary benefit of these rules and revisions to them is the reduced risk of illness and contamination of ground and surface waters. Additionally, the risk of the associated health and non-health costs of waterborne outbreaks and ground and surface water contamination will be avoided. Proper implementation of the rules will increase the probability that OSS will not back up or surface, and that sources of drinking, recreational, and shellfish growing waters will be better protected. The environment will be more readily protected. Finally, homeowners will benefit from systems that are less likely to fail and need to be replaced.

LIST OF PROPOSED CHANGES, INCLUDING ESTIMATED COST & BENEFIT INFORMATION

For the remainder of Part C, the costs and benefits of the specific changes within the proposal are considered. The significant changes fall into one of three topical categories: Product Development and Registration, Technical Requirements for Design and Installation, and Local Management and Planning. The specific changes in each of these categories will be considered as a group with an overview provided at the beginning of each of the categorical groupings.

Product Development and Registration

Over the past several decades, new technologies have emerged to address the limitations of the traditional septic tank and gravity drainfield. These technologies have made it possible to develop lots that were previously unbuildable due to poor soils or site limitations. These new

technologies can be "public domain" products that are developed without a patent and are widely studied with a large volume of data regarding their effectiveness. They can also be "proprietary products" developed with a patent and sold and marketed by a private entity.

Historically, the SBOH OSS rules have required alternative systems to have a guidance document for that type of system developed by DOH in order for the system to be permitted. Currently, an alternative system is any system other than a conventional gravity or pressure distribution system. Over the years, a framework has developed where DOH provided a "List of Approved Systems and Products" (Approved List). The list helps local health jurisdictions and designers to select appropriate products. In order to get on the Approved List, the existing rule provides two options for alternative systems and proprietary products. The first option is to use DOH guidelines to determine the appropriateness of "alternative systems" and verify that the proprietary product satisfies the criteria in the guidelines. The second option is to use the "experimental systems" allowance.

The changes in this area create a barrier to disease prevention by assuring technologies have the capabilities necessary to provide necessary treatment and dispersal. An objective, measurable, and consistent regulatory framework for the registration of products is provided. All products will be subject to the same requirements, unlike the current practice. While local health jurisdictions make the final decisions on how various technologies are applied within their jurisdiction, local health departments all want a centralized review and listing process; they have neither the time nor technical background to evaluate each new technology. Likewise, manufacturers or proponents of products prefer to have a central entity to which information can be submitted for registration, rather than having to be reviewed by each local health department.

These processes, together with the treatment levels discussed in the technical changes section, will encourage the development of technical advances. This will result in more options and flexibility for designers and homeowners.

1. Alternative Systems: Repeal of former section -0400

Description

Alternative systems are currently defined as systems other than conventional gravity or conventional pressure distribution systems. The term was necessary because a unique process to permit alternative systems was required. This term and practice created a stigma, resulting in alternative systems being considered inferior to conventional systems by some.

By applying the same requirements for all technologies, neither the term "alternative systems" nor the process of approving them is necessary. Thus, the proposed rules repeal the current alternative systems section and replace it with a product registration process. The processes for approval of the various components of an OSS are discussed in items 2-4. The proposed change is not directly the result of public health concerns, but it allows the new framework to be established.

Proposed changes with anticipated costs & benefits

Alternative systems deleted Definitions changed and section deleted

Cost: None anticipated, as process is being replaced

Benefit: Will be discussed in benefits of items 2-4

2. Proprietary Treatment Products: New sections -0110, -0120, & -0125

Description

Proprietary (held under patent or trademark) treatment products are used when a site requires additional treatment beyond that provided by a septic tank. These products include proprietary components, such as aerobic treatment units (ATUs), packed bed filters, and upflow filters, that provide treatment prior to discharge to a soil dispersal component, commonly called a drainfield. The current rules require a proprietary treatment product to be on the DOH's "List of Approved Systems and Products," the "Approved List" before it can be used.

Detailed testing protocols (specific testing methodologies including sampling procedures and frequencies) are needed to assure that all products go through the same consistent testing process. Since the last rule revision, national protocols for non-residential sewage and nutrients (nitrogen and phosphorus) and for technologies developed to handle flows greater than 1,500 gallons per day have been developed. Thus, DOH now has additional tools available to assure a technology has the initial capability of meeting a specified performance.

The protocols are limited in that they are only test the initial performance capability of the product. The protocols require results of sampling to be 30-day averages, which require multiple weekly samples. The protocol are not intended to be used for measuring field compliance, since having a sufficient number of samples to develop 30-day averages is not economically feasible for small systems.

The proposed rules establish a registration process to replace the current listing process. The rules specify the detailed protocols that must be used in testing the performance capabilities of the treatment process and treatment levels that can serve as targets for the testing. The proposed rules also provide a process for technologies on the current "Approved List" to transfer to the proposed registration list.

Proposed changes with anticipated costs & benefits

Registration of proprietary treatment products The proposed rules formalize the existing process and requirements for listing proprietary treatment products by moving it from guidance to rule. The requirement for registering products replaces the current listing process on the Approved List.

The proposal identifies specific protocols for three categories of treatment products and one protocol to demonstrate nitrogen reduction (in section -0110). It also establishes an administrative process for product registration (in section -0120). All testing is to be done by American National Standards Institute (ANSI) certified laboratories to assure proper quality control and assurance of the testing process.

The proposed rules require all proprietary treatment products to be tested to the same, consistent, nationally established standards and protocols. These same standards and protocols are used by other states, so Washington will not be the only state requiring the testing.

Registration verifies that a product has satisfied the testing protocol and administrative requirements and, consequently, is available for use in the state. Soil and site conditions will determine what level of treatment is required. The design professional then selects a treatment technology that satisfies the site's treatment level requirements. The testing protocols are solely for meeting the product registration requirements, not for verifying field compliance.

The systems and products currently on the Approved List have already been through testing, some using a national standard and protocol. The proposed rules provide a streamlined process for products currently on the Approved List to become registered (in section -0125).

Because national protocol for testing all treatment products were not available until recently or were not specified in guidelines, some systems on the current Approved List were tested using protocol developed in conjunction with DOH and the TRC. Thus, the testing protocols have varied. This has led to some questioning of the DOH process used for some technologies, whether equivalent levels of stringency have been applied.

Cost: The primary entity established to test proprietary treatment products is the National Sanitation Foundation (NSF), an international testing entity in Ann Arbor, Michigan.

- The majority of systems (Category 1- residential sewage) will have to be tested to the NSF Standard 40 protocol. NSF testing costs for this standard are approximately $70,000 to $80,000.
- For Category 2 systems (high strength sewage) the Environmental Testing Verification testing protocol will be required. The NSF cost is likely to be $60,000 to $80,000.
- For a Category 3 system (composting and incinerating toilets)

NSF Standard 41 and Protocol P157 will be required. The cost for this NSF testing will be $18,700 for composting toilets and $10,000 to $12,000 for incinerating toilets.

Other ANSI certified entities may do the testing but must use the same protocol. The costs for non-NSF facilities are estimated to be similar.

All these standards are national standards, standards that are used by other states. Thus, a manufacturer will not be testing their product only for Washington State.

NSF provides a national listing for technologies that go through their testing process and pay for on-going listing, so that all states can better know the results of the testing. Thus, manufacturers will be paying the expenses for testing so their products can be used throughout the country. They can recoup their development and testing costs from a much larger sales area than Washington State.

These rules do not impose new costs for the majority of products. This is because current departmental guidance requires this testing in order to be placed on the current "Approved List." Manufacturers have incurred these expenses to provide DOH with assurance that their system will perform to the established treatment standards in order to be placed on the Approved List.

Current rules contain a fee for the review of proprietary products. It is anticipated the manufacturer will pay DOH for registering their product. It is also anticipated there will be a fee for renewing the registration on an annual basis. The fees have not yet been established by DOH.

Benefit: The proposed rules establish consistent protocols, a level "playing field," for the testing of all new products. All manufacturers must meet the same requirements. This process will assure that products meet the registration requirements established in the rule.

It is anticipated that most products already on the Approved List will be able to use their existing test data to move from the Approved List to the new registered list. This is at the option of the manufacturer.

Public health is protected by assuring a product can meet specified performance standards.

3. Bacteriological Reduction: New sections -0130 and -0135

Description

The current rule provides Treatment Standard 1 and Treatment Standard 2. These are performance standards that must be met by some treatment component prior to discharge into the soil. These standards contain values that must be met for three different parameters discussed earlier: organic strength (as measured by $CBOD_5$), TSS, and FC. There are existing national standards or protocols (from NSF – see discussion in item #2) that include testing for $CBOD_5$ and TSS. However, there is not an NSF or other national standard or protocol that contains requirements for testing bacteriological reduction equipment, such as ultraviolet radiation (UV), chlorination, or ozonation.

The current rules require a technology that meets Treatment Standards 1 or 2 where a site's conditions are more sensitive, for example, on a site with coarse soils, shallow soils, or a repair system with reduced soil depth and horizontal separations. In other words, technologies that meet these standards are required where the soil characteristics are insufficient to provide adequate treatment and public health protection by passage of effluent through the soil alone. There must be assurance that a technology can satisfactorily reduce the numbers of indicator microorganisms (FC) to provide the level of treatment and public health protection the soils or other treatment cannot provide.

The proposed rules provide for three treatment levels (A, B, & C) that have varying values for $CBOD_5$, TSS, and FC. The greater the sensitivity of a site, the more stringent the required treatment level and the lower the values of the parameters, especially for FC, for that site will be. The $CBOD_5$ and TSS portions of the treatment levels are low which helps prevent clogging of infiltrative surfaces in OSS components, and helps assure the bacteriological (FC) reduction process can be more effective.

Because national protocols for bacteriological reduction are not available, DOH is currently allowing untested products like chlorine and ultraviolet radiation (UV). These products are added to treatment technologies that can meet the required $CBOD_5$ and TSS values but not the FC values. For a few systems, DOH has accepted testing done using protocol agreed to between the manufacturer and either DOH or NSF. The bacteriological reduction protocol used to test these systems varied.

Because of the lack of adequate, consistent testing and a history of poor performance by the disinfection products that have been used, the TRC, and the RDC recommended the practice of allowing untested disinfection products end. Thus, section -0130 establishes consistent testing requirements and protocol for verifying the bacteriological reduction abilities of treatment products. The administrative process is the same one used in section -0120. Section -0135 establishes how products will transition from the current Approved List to product registration.

Again, this testing protocol is solely for meeting the product registration requirements, not for verifying field compliance.

Proposed changes with anticipated costs & benefits

Bacteriological reduction

The proposed rule establishes a protocol for determining the bacteriological reduction capabilities of products. This protocol was developed in consultation with staff at NSF. The fecal coliform standard is a critical public health measure that has, until now, not been required to be demonstrated by proprietary products. In light of serious doubts about the effectiveness of disinfection products currently used and numerous reported failures, the proposal now requires testing to demonstrate that the fecal coliform part of the standard is met.

All manufacturers that want to be able to use their product to meet the FC requirements of Treatment Levels A, B, or C of the proposed rules must verify their product can meet the applicable FC value of a treatment level. They must subject their product to the testing protocol established in the proposed rules and satisfactorily meet the values in the applicable treatment level. This includes manufacturers of proprietary treatment components currently on the Approved List that have not been tested for bacteriological reduction.

Testing according to this protocol can be done by using the bacteriological reduction protocol specified in this rule (for technologies already tested for CBOD5 and TSS) or in conjunction with other protocol testing for CBOD5 and TSS. The testing protocol may also be applied to testing the bacteriological reduction capability of 1) a proprietary treatment unit by itself, 2) a proprietary treatment component (like a mechanical aerobic treatment unit) with a disinfection product (e.g. chlorine or UV) added to the discharge side of the treatment component, or 3) just the disinfection product itself.

In order for products that meet the FC values for the different treatment levels to be permitted, manufacturers or proponents of those products must have their product registered using the registration process contained in the proposed rules.

A process for products to transition from the Approved List to the proposed registration list is provided in section -0135. This will apply to the few proprietary treatment components currently on the Approved List that have been tested for bacteriological reduction. If the testing for those products does not meet the protocol described in the rule, the products must still go through a testing program in order to be registered for use in the state. Because some testing has already been done, a shortened testing program is available to manufacturers of those products. While the testing period is a shortened one, the

actual testing protocol is the same used for the full test. The intent is to verify the results of the initial bacteriological reduction testing done to be placed on the current Approved List.

Cost: The department estimates NSF's cost to manufacturers to have a product tested in the NSF ANSI certified lab in order to meet the protocol for the full testing period described in the proposed rules to be $22,000.

The manufacturer's cost for the shortened two-month testing program is estimated to be $7,650. This process is specified in Section -0135.

Current rules contain a fee for the review of proprietary products. It is anticipated DOH will have a fee to be paid by the manufacturer for registering their product. It is also anticipated there will be a fee for renewing the registration on an annual basis. The fees have not yet been established by DOH.

Benefit: This proposal will ensure that all products registered to meet Treatment Levels A, B, or C have been tested to the protocol and verified that the FC levels in the treatment level were met in the testing. This is critical, since this is the primary public health prevention parameter. Without testing to the specified protocol and without verification that the FC levels can be met, there is no assurance that public health concerns are being satisfied. The probability of a person or the public coming into contact with insufficiently treated sewage is increased. This increases the risk that the various costs that occur when a disease outbreak occurs or when a body of ground or surface water is contaminated with effluent containing high numbers of FC may be imposed.

The proposal provides a consistent protocol, developed in consultation with a nationally recognized standard development and testing organization, one that all manufacturers must meet. As with the other portions of the registration program, placing this protocol in rule provides all manufacturers with a clear and objective standard and a path to achieve the standard.

A shortened process is available to manufacturers who have already gone through the time and expense of testing their product for bacteriological reduction, although the testing was done without the benefit of consistent, detailed protocol. This will reduce the cost to manufacturers somewhat.

4. Proprietary Distribution Products: New sections -0140 , -0145 & -0150

Description

Proprietary (held under patent or trademark) distribution products are used in some treatment components, as well as in different soil dispersal component (drainfield) options. These products include products that are used in lieu of gravel in various components and the tubing used in subsurface drip systems.

The current rules require an alternative system, including a proprietary distribution product, to be on the DOH Approved List before it can be permitted in Washington State. In order to be placed on the Approved List, there must be a DOH guidance document for that type of technology. The manufacturer or proponent of the product must then have a third party, a professional engineer or a designer, certify the product meets the specific requirements in the guidance document. This requirement is currently in guidance.

The criteria that must be met for listing a proprietary distribution product is being moved from DOH guidance to the SBOH rules as part of a new product registration process. Section -0140 establishes the required criteria for registration, including the certification by a professional engineer. The criteria are the same as those currently specified in guidance. Section -0145 establishes the administrative process that must be followed for manufacturers to have their product registered. Section -0150 describes how products currently on the Approved List can become registered.

Proposed changes with anticipated costs & benefits

Registration of proprietary distribution products

The proposed rules establish the criteria, standards, and an administrative process for registering proprietary distribution products, just as they do for proprietary treatment products. These standards are primarily design, structural, materials, and construction standards, not testing standards as with proprietary treatment products. The requirements are the same as those currently in guidance. Because the requirements are currently in guidance, there have been concerns about the legal enforceability of this process for proprietary distribution products.

A process is provided for proprietary distribution products on the current Approved List to transition to the registration list.

Cost: For products not currently on the Approved List, the cost to have a professional engineer certify the required standards are met is estimated to be $750 to $2000. This is not an additional cost, as manufacturers have been required to meet the same requirements to

get on the current Approved List, even though the criteria were in guidance.

For products currently on the Approved List, a manufacturer will not be required to have their products approved again, because the criteria are the same.

Current rules contain a fee for the review of proprietary products. It is anticipated DOH will have a fee to be paid by the manufacturer for registering their product. It is also anticipated there will be a fee for renewing the registration on an annual basis. The fees have not yet been established by DOH.

Benefit: Since there are no additional costs estimated for manufacturers of proprietary distribution products, the primary benefit belongs to DOH. Because the requirements are in guidance, the current process is not legally enforceable. The proposed rules provide the legal authority for DOH to administer and enforce this process.

In order to register a product under the proposed rules, a manufacturer with a product on the current Approved List will not have to recertify that the product meets the specified criteria and standards.

5. Experimental Systems: Repeal of previous subsection -05001, new section -0175 added for transition from experimental system program to application for product registration.

Description

The current rules define an "experimental system" as an alternative system for which a guidance document has not been developed or a proprietary product that is not on the Approved List. The experimental systems program currently allows product developers to work with DOH and the TRC to establish a test protocol for determining the effectiveness of a proprietary product. After the testing is complete, the manufacturer shares the results with the TRC and the department and the product can be placed on the Approved List if the results are acceptable and a guideline is written for the product's use. Thus, this is an alternative pathway for a product to get on the Approved List.

Until recently, consistent, national testing protocols for many technologies were not available (See item #2). Thus, the SBOH determined an experimental process was needed to provide avenues for new technologies to be tested in our state. As mentioned, this process required the development of protocol, based on the technology being evaluated. Over the years this program has been administered, the testing protocols have varied considerably, even the protocols for similar products. This leaves DOH open to claims it has been arbitrary.

When a system or technology has satisfactorily been placed in the experimental system program (there have only been three or four in the last decade), the process has been very time consuming for DOH. Time is required to establish the testing protocol, administer the program, and assure the testing and reporting protocols are followed.

Because of the current availability of consistent, national standards and protocols, as well as the liability to and the time demands on DOH, the experimental system program is proposed to be repealed. There may be experimental systems or technologies undergoing testing as of the effective date of the proposed rules. They will be allowed to finish their testing and be placed on the approved list or registered list, depending on the testing results.

Proposed changes with anticipated costs & benefits

Experimental systems deleted & transition from current list to new list

The proposal repeals the existing experimental system program. The proposed registration process will negate the need for an experimental system program. Additionally, section -0175 defines a process that will allow systems or technologies still undergoing their testing on the rule's effective date to complete the testing. If the results of the testing meet desired expectations, the product may be registered for use.

The primary effect of eliminating the experimental systems program is that developers of new treatment products will no longer be able to use this method to gain product approval. Instead, they will have to follow the requirements for product registration specified in other sections of the proposal.

Cost: The proposed rule requires treatment products to be tested according to specified protocols in order to be registered. The cost of this testing is between $60,000 and $80,000 depending on the type of treatment product. A rough estimate of the cost of gaining approval through the current experimental systems process is $20,000. Therefore, the elimination of the experimental systems program could increase costs for product developers by approximately $40,000 to 60,000.

Benefit: Benefits from eliminating the experimental systems program include:

- A public health benefit that comes from having consistent, nationally acceptable methodology and testing protocols for approving proprietary treatment products. All proprietary treatment products will be required to go through the same NSF-based testing to prove that those products can adequately protect public health.
- A product undergoing testing in the experimental system program only has the assurance that the testing results will be accepted within Washington State. If a product is tested to the national

protocols, the testing will be acceptable to all states, even though the cost to the manufacturer will be greater. This will allow manufacturers a much larger market to recoup their development and testing costs.

- Additional costs often arise from the inconsistencies that are endemic to the current experimental systems process. For example, DOH recently engaged in lengthy and costly litigation with an entity whose application for an experimental system was denied. Although the courts eventually sided with DOH, DOH incurred legal fees of $50,000 and expended an estimated 150 hours in staff time. Because the experimental systems process is inherently vulnerable to legal challenge, these legal fees, and the legal fees incurred by opposing parties, must also be included as costs of the experimental systems program. This is especially a concern because of the very small numbers of technologies that have taken advantage of this process. Eliminating the program means that these costs will be avoided, and, therefore, counted among the benefits of eliminating the program.
- DOH and the TRC are not equipped to thoroughly evaluate experimental systems. There are problems with inconsistent assessments and judgments due to on-going committee turnover. This creates concerns that decisions are not based on sound science. This contributes to the legal concerns resulting from inconsistent testing protocols and program administration. These problems will be avoided by eliminating the program.
- DOH does have a fee for a product entering the experimental system program. This fee only covers DOH staff time to review the application for entering the program. The fee does not include TRC time; expenses for legal assistance; or DOH time expended in providing on-going oversight, technical assistance, and any needed enforcement throughout the testing period. Thus, costs to DOH may surpass the anticipated costs to a manufacturer wanting to place their product in this program. This situation is exacerbated by the fact that if staff is engaged in oversight, technical assistance, or enforcement activities, they are not available for other needed activities, which has an adverse cost of its own.

On the basis of this analysis, the department concludes that the likely benefits of the eliminating the experimental systems program exceed the likely costs.

6. Product Development Permits (PDP): New section -0170

Description

This section establishes a new discretionary product development permit (PDP), administered by Local Health Jurisdictions, to allow a manufacturer or other entity with a system under development to gather information about the product's field performance. While it has some perceived similarities to the current experimental system program, successful completion of the data gathering does not lead directly to product registration. It is proposed as a process for gathering sufficient data on a treatment product to enable the proponent to decide if the product shows sufficient merit to initiate the process leading to product registration.

Proposed changes with anticipated costs & benefits

Product Development Permit process established A process that provides an opportunity for a manufacturer or other entity to gather data on their systems in the real world. Use of the PDP is totally discretionary.

Cost: There is no cost associated with this rule change, unless a manufacturer or other entity chooses to use this allowance.

The local health jurisdiction will likely have fee to administer the program, which must be paid by the product's proponent.

Benefit: The proposal benefits the manufacturer or other entity, because it allows them to test a theory or process and gather data about its performance.

Technical Requirements for Design and Installation

An OSS provides two primary functions: 1) treat the sewage, and 2) disperse the sewage into the subsoil receiving environment. The initial treatment of sewage in an OSS occurs in the septic tank or other treatment device. Effluent (sewage flowing out of the septic tank or other treatment process) receives its final treatment (usually the vast majority of pathogen removal) in the soil portion of the OSS, a component called a soil dispersal component or drainfield.

In order for an OSS to remove bacteria and viruses, soil must be aerated, not saturated with water. The soil must sufficiently slow down the rate at which sewage flows through it. The sewage must be able to slowly flow through an adequate depth of soil for proper treatment. When soils are too coarse or too shallow to provide adequate treatment, other technologies that provide higher levels of treatment must be used. These technologies are typically more complicated. They are also more costly, in both initial capital costs and on-going monitoring and maintenance costs.

For this part of the proposed rules, the revisions intend to create barriers to disease transmission by helping assure proper siting, design, and installation of OSS by: 1) ensuring a level of treatment is provided that is commensurate with the conditions (including soils) of a given site; and 2) preventing a drainfield from being hydraulically overloaded (more liquid is discharged to a drainfield than it was designed to handle).

On-going research is changing our knowledge of how OSS work. We have learned that what appeared to have been "working" satisfactorily for years is not to be the best way to assure proper treatment and dispersal of effluent. In other words, current practices aren't always the best way of managing the potential risk of waterborne disease outbreaks or ground/surface water contamination.

To address all the technical areas of the current rules, DOH's Technical Review Committee (TRC) evaluated current data and research, discussed options, and made recommendations to the RDC. DOH staff performed literature searches on the primary technical issues and developed reports for the TRC. These reports are all available at: http://www.doh.wa.gov/ehp/ts/WW/TechIssueReports.htm or by contacting DOH. The recommendations on technical issues were presented to and discussed by the RDC prior to development of final decisions, usually based on consensus vote, the rest on a 2/3 majority vote.

The changes are generally modifications of existing standards and practices. Many of the current standards and practices are in guidance; others are based on the standard of practice exercised by field practitioners.

There is neither a federal rule nor a national consensus code for OSS design and installation. Thus, the SBOH is left to develop minimum technical standards for Washington State. The proposed changes are based on an extensive review and reflect the body of scientific knowledge about the most reliable design standards. These standards will extend the life of OSS and, thereby, reduce the public health risk from failing systems and reduce the long-term costs to system owners over the life of their systems.

Individually, some requirements may increase initial costs, while some may decrease costs. As specified earlier, different requirements may be combined in varied ways, due to the various options available to the design and installation professionals. Also, because each system is designed for an individual site, it is unknown how many sites may be affected by one or more of these design changes.

The design section in the current rule is divided into 4 proposed sections for clarification (items 4-7). The changes to these four new sections are all based on technical recommendations made by the TRC and RDC. They represent the latest advances in the understanding of onsite sewage disposal. These changes all increase the probability of a longer term life for OSS. The proposal minimizes health risks from failures, and maximizes cost savings over the life of the system.

At the end of this report there are two appendices that attempt to summarize the net effect of some of the proposed changes on cost. Appendix A presents a comparative overview of the

costs resulting from proposed changes to the design and installation requirements. Appendix B provides sample cases summarizing the effect of proposed changes on system cost.

1. Permit Requirements: Section -0200 (formerly "Permits for OSS under 3500 gallons per day" in section -9001)

Description

This section establishes the permitting process and the minimum permit application contents that apply to new or OSS repairs. Currently, the rules require a system owner to go through the permit process for all installation, repair, or modifications. However, many local health jurisdictions already recognize that there are some small repairs or changes to an OSS that should not be subjected to the complete permit process. These actions include things like replacing a broken pipe or adding risers to the surface for easier access. This proposal allows these smaller system issues to be addressed without having to meet all the requirements of a site evaluation, a detailed design, and an installation permit.

Additionally, the current rules do not specify a maximum period of validity for permits. The proposed rules specify a maximum period of validity of five years.

Proposed changes with anticipated costs & benefits

Installation permit exemptions

The proposal adds a new subsection (2) establishing certain activities that do not require an installation permit.

Cost: There are no increased costs because the public health risk of allowing these activities without a permit is extremely low. This change simply makes the state rules consistent with practices already occurring in most health jurisdictions.

Benefit: The main benefit is the reduction in unnecessary time and expense of the permit process. The avoided cost of permits at local health jurisdictions ranges from $100 to $500. System owners will also avoid the cost ($50 - $500 or more) of hiring a designer to develop a design.

Permit expiration

Subsection (4) (c) sets a permit expiration date of five years. This means that if a permit is not acted on within five years, the system owner will need to go through the permit process again. Local health jurisdictions currently have an expiration date of five years or less after an approval has been given, and typically allow renewals. This change will reinforce what is being done locally.

Cost: A cost will occur if a system owner has to pay for a new design ($50 - $500+) and permit ($100 - $500) if a permit expires. However, since local jurisdictions already impose an expiration date for the approvals and permits they issue, no additional costs are anticipated.

Benefit: The benefit is assurance that systems will be built to the most up-to-date standards. Also, confusion caused by systems permitted under previous regulations is avoided.

2. Location: Section -0210 (formerly section -09501)

Description

This section establishes the limitations for locating an OSS on a parcel of land, and includes requirements for horizontal setbacks. A horizontal setback is the distance between an OSS component and some feature that can be adversely affected by the OSS, or that could adversely affect the performance of the OSS. The purpose of horizontal setbacks is to install OSS that prevent sewage from reaching drinking water or surface water or from surfacing on the ground before the soil can provide adequate treatment.

The proposed rule adds several new features to the setback table that most designers already consider when they develop a design. It is unknown how frequently these features are on a parcel containing an OSS.

Proposed changes with anticipated costs & benefits

Changes to setback table In subsection (1) the proposal adds new categories to the horizontal setback table. These include setbacks for in-ground swimming pools, stormwater infiltration systems, other soil dispersal components, and other site features that may allow effluent to surface.

The primary reasons for adding these new setbacks are: 1) to clarify the appropriate setbacks from these features, as they all can intersect underground flows of sewage; 2) to provide consistency by providing specific minimum setbacks; 3) to assure appropriate protection to health is provided when these features exist.

Cost: Potential system owners may incur costs if there is not adequate room on a lot to provide the required setbacks, and no setback from these features has been previously required by the local health jurisdiction. It is anticipated that this will occur very infrequently, if at all, because of the existing standards of practice. If this does occur, the costs will be variable depending on what options are available and implemented. They will range from 1) having to find another piece

of land with satisfactory soil and site conditions to 2) using more expensive technologies that provide higher levels of treatment to 3) not building on the property.

Benefit: Anticipated benefits include:

- Assurance that systems are designed to prevent inadequately treated sewage from:
  - Coming to the surface where people may come in contact with it because an in-ground swimming pool intersects the lateral sewage flow.
  - Contaminating drinking water or coming to the surface where people may come in contact with it due to a stormwater infiltration pond being too close to the OSS.
  - Contaminating drinking water or coming to the surface where people may come in contact with it because an area with two OSS located too close to each other hydraulically overload the soil.
- Improved clarity and consistency in how this table is interpreted statewide.

3. Soil and Site Evaluation: Section -0220 (formerly section -11001)

Description

This section contains minimum requirements for evaluating a site for the possible OSS installation on the site. The current rules require a detailed site evaluation to provide the necessary information so the design professional can choose technologies that provide the most appropriate fit for that site. The rules specify who may perform the evaluation (designer, professional engineer, soil scientist, and local health officer) and minimum evaluation requirements.

This section in the current rules also describes the various soils and places them into eight different "Soil Type" groups. The characteristics that are used to place a particular soil in one "soil type" group include: 1) texture (amount of sand, silt, and clay in the soil); 2) structure (how the sand, silt, and clay particles are "clumped" together); and 3) gravel content. These groups are then used to determine appropriate hydraulic loading rates (how big a drainfield is) for an OSS to be placed on that site. The purpose of these descriptions is to create a consistent methodology for determining OSS drainfield size.

The proposed rules contain similar requirements. The primary changes proposed in this section include:

- "Soil Scientist" is defined, and restrictions are placed on what a soil scientist can do.
- Changes are made to the definitions of various soil types in the Soil Classification Table. The proposal reduces the number of useable soil types from eight to six, simplifying the table. The proposal shifts some sands to the next "lower" soil type. Other changes

related to gravel content and structure also are proposed. When combined with the loading rates (how many gallons can be applied to each square foot of drainfield) in section -0234 (Item #6), the effect of these changes will result in a larger or smaller drainfield.

The changes to the soil table are based on recommendations from the TRC. The TRC reviewed technical reports developed by DOH staff and the 2002 EPA manual. The technical reports include information from all appropriate research and experiences of individuals around the state and country. The benefits come from aligning department rules with the best available science and the emerging understanding of the treatment and disposal abilities of various soil types; thus, assuring more reliable and predictable treatment and public health protection. Some of the changes will result in cost increases; some of the changes will result in cost decreases. The potential costs and benefits of these changes are not fully realized until they are combined with the changes in sections -0230 and -0234.

Proposed changes with anticipated costs & benefits

Changes to soil scientist credentials and activities

The current rules allow a soil scientist, as well as a designer, professional engineer, and the local health officer to evaluate a site. Chapter 18.210 RCW, passed in 2000, established Washington's state designer license. Site evaluation is included in the definition of design in that legislation, and as such is within the purview of designers.

The current rules require no qualifications for a soil scientist. Theoretically, anyone could call themselves a soil scientist and be able to evaluate a site. There is no state licensure for soil scientists in Washington State. The only credential that exists is a national certification, a voluntary certification by the American Society of Agronomy (ASA). The proposed rules define a "Soil Scientist" as someone that has this certification.

A soil scientist is trained and equipped to know soils. They are not trained to evaluate site conditions other than soil, such as slope and topography. Their skill set typically does not include measuring distances and directions either. Thus, the rules propose limiting the authorized activities of a soil scientist to evaluating soil.

Cost: This change is expected to have little, if any, impact in terms of cost because discussions with industry revealed that most soil scientists who have been performing both site and soil evaluations already their designer license (and so will be able to continue to perform the site evaluation). Further, the department is not aware of anyone performing soil evaluations without ASA certification.

Benefit: This proposal assures that qualified individuals evaluate soils and

other site conditions for placing an OSS. Evaluating the soil and site conditions is one of the critical components in OSS design to ensure a proper OSS is installed on a site. If errors are made, significant public health problems can result.

Finally, these changes provide greater agreement with state statutes and rules concerning designer licensing. Department of Licensing staff has concurred with these proposed changes.

Gravelly coarse sands added to type 1 soil

Type 1 soils are very coarse soils. When percolating through type 1 soil, septic tank effluent will pass through the soil so fast that treatment, especially pathogen removal, will not occur. Gravels and coarse sands, especially when they occur together, create the same concern. Because of these concerns for public health, higher levels of treatment are required prior to discharge to the soil in a drainfield.

Because of the public health concern, this change adds "gravelly coarse sands" to the grouping of soils in Soil Type 1.

Cost: A higher level of treatment will be required for gravelly coarse sands, resulting in increased costs of $500 - $5,000. The amount of the increase will depend on which Treatment Level must be met (in section -0230), which technology is selected by the design professional, depth of the soil, and what soil materials fill up the space between the gravel particles. The number of systems impacted by this proposed revision cannot be determined.

Benefit: Ground and surface water will be protected because a minimum level of acceptable treatment will be required prior to discharge to the gravelly coarse sands. The potential costs associated with waterborne disease outbreaks or ground/surface water contamination will be avoided.

Limits on extremely gravelly soils

As the amount of gravel in a soil increases, there is increased concern that the soil will not provide sufficient treatment. This is the reason that all extremely gravelly soils are currently included in soil type 1. When the void space in between the gravel particles is filled with finer textured materials (for example silt and clay soils), the concern for treatment is reduced. Thus, soil types 5 & 6 having up to 90% rock fragments by volume are proposed to be no longer included as soil type 1.

Cost: A lower level of treatment will be required. Costs of systems in these soil types will decrease ($500 – $5,000). The reduction in cost will

depend on the depth of soil, which treatment level must be met (in section -0230), and which technology is selected by the design professional. The number of systems impacted by this proposed revision cannot be determined.

Benefit: Soil types 5 and 6 will provide adequate treatment so no reduction in treatment provided will occur. The higher level of treatment currently required is not necessary.

Some sands moved down 1 soil type level

Research, experience, and recommendations in the 2002 EPA manual suggest that that some sands in the current soil type descriptions were being loaded with too much septic tank effluent, creating an increased potential for backing up or surfacing of sewage. Various sands (medium, fine, very fine, and loamy very fine) are being moved down one soil type designation.

Experience around the state and country supports this change. The change is also consistent with the 2002 EPA onsite manual. In fact, the EPA manual suggests an even lower loading rate yet (and a bigger drainfield) for fine sands.

Cost: When combined with the loading rates in section -0234, loading rates will decrease by 0.2 gal/ft^2/day. This will increase the size of the drainfield and likewise the cost of the system. The largest impact is expected to come in counties with sandy coastal soils. On existing small lots with medium or fine sands, the larger drainfields may create problems fitting everything on a lot and may result in a change in the property owner's plans. For example, on a 7,500 square ft. lot, under the current rules, approximately 6% of the lot would be taken by the drainfield. This increases to 8% of the area with the proposed revisions. The number of systems impacted by this proposed revision cannot be determined.

Benefit: This will help minimize failures in these soil types due to hydraulic overloading and increase the probability of a longer life for a system installed in such soils.

Type 6 soils can be treated as type 5 soils

Soil structure refers to the way sand, silt, and clay particles are "clumped" together. There are various levels of "strength," or how readily the "clumps" stick together, to soil structure. This relates to how readily a soil comes out and remains in clumps when the soil is handled. A soil with a moderate or strong structure will transmit effluent faster due to pathways around the outside of the soil structural units. Thus, such soils can treat and disperse of greater

amounts of liquid. When combined with the loading rates in section -0234, drainfields in such soil can be smaller. Soils that were type 6 move to type 5 if they have moderate to strong structure.

Cost: The size of the drainfield will be decreased by 50%, reducing the cost of the drainfield ($500 - $1500+, depending on design flow). In several counties, this is currently already commonly allowed through the waiver process. Adding this to the rules will reduce the cost of going through the wavier process for both the applicant and the local health jurisdiction. The number of systems impacted by this proposed revision cannot be determined.

Benefit: There will be a significant reduction in cost due to the smaller drainfields. This will occur without any reduction in public health protection.

Restrictions with platy structure

One form of soil structure is called "platy." This structure type consists of sand, silt, and clay particles "clumped" together in flat structural units oriented horizontally. This type of structure acts as a barrier to effluent moving downward through the soil. When this type of structure becomes moderate or strong, that is more noticeable, this barrier becomes more severe. Thus, proposal prohibits OSS installation in soils with moderate or strong platy structure included in the vertical separation below a drainfield. This is consistent with information in the 2002 EPA manual.

Cost: Information does not exist about how much land area has this type of structure at soil depths that would affect OSS. If a site contains this type of structure, a more expensive OSS will probably be required if it results in a lesser vertical separation. This cost will vary depending on actual available soil depth, other soil characteristics, and the option selected by the design professional.

Benefit: This type of structure increases the potential for sewage to surface or contaminate ground/surface water. This change will help minimize this potential.

Restriction with expanding clay

Clay can have a variety of different mineralogies. Clays with some mineralogies will expand or swell when liquid, including effluent, is added. This reduces the soil's permeability and significantly increases the potential for failure.

The proposed rule clarifies that systems should not be installed in a soil with this type of clay. The current rules do not mention this type

of soil. DOH guidance documents restrict the of use OSS in these soils, thus this change is already standard practice.

Fortunately, there are few, if any, locations in Washington State that may contain expanding clays. Also, DOH is not aware of any systems currently being placed in this soil type in the state.

Cost: There should be no affect on cost.

Benefit: The increased potential of failure (primarily surfacing of sewage or sewage backing up into a structure) of installing OSS in soils containing expanding clays will be avoided.

4. Design Requirements – General: Section -0230 (formerly contained in section -11501)

Description

The current rules specify who can perform designs, how to size drainfields, and the required treatment standards and distribution (gravity or pressure). The required treatment standards and distribution depend on the soil type and depth of soil below the drainfield (vertical separation).

Sites with soils that can be expected to provide sufficient treatment (deep, not coarse) usually result in the least expensive system (septic tank and gravity flow drainfield). As the soils get less able to provide sufficient treatment (shallower, coarser), systems get more expensive. The first step is to require pressure distribution rather than gravity, still using only a septic tank. The next step starts adding technologies that provide varying higher levels of treatment (when treatment standards 1 and 2 apply) prior to discharge to the existing soil, because the soils are very shallow and/or very coarse. System cost can increase substantially as higher levels of treatment prior to soil discharge are required. This set of requirements is presented in the current Table IV.

The proposed rule has several treatment levels to replace the current Treatment Standards 1 & 2. Two proposed treatment levels (Treatment Levels A & B) closely parallel the existing two treatment standards (1 & 2). The quality of septic tank effluent typically resulting from a single family residence has been approximated (not mentioned in the current rule, specified in the proposed rule). A new "mid-level" treatment standard has been added between the current Treatment Standard 2 and septic tank effluent in order to provide technologies for mid-range levels of treatment for sites with mid-range levels of sensitivity. The hope is to avoid requiring technology that may provide too much or too little treatment, as was deemed possible in the current rules with just two treatment standards. Also, for nitrogen sensitive areas, a standard for nitrogen reduction is included.

The purpose for the proposed expanded set of standards is to assure that technologies provide levels of treatment commensurate with their level of sensitivity, while increasing the flexibility available to designers and property owners. The proposed rules describe how to match the site conditions of vertical separation and soil type with the OSS technology's Treatment Level and

method of distribution. The effect of these changes is variable – some sites will require technologies that cost more, others will cost less.

Proposed changes with anticipated costs & benefits

Restriction on marine shoreline designs

Marine shoreline sites are typically considered more sensitive than many other sites, many having shallower soils. Also, shoreline waters, due to their varied use as shellfish growing and/or recreation areas add to the sensitivities. Many times, more complicated systems using higher levels of technology are required. Because of this, it was concluded that only licensed design professionals should be able to design such OSS.

In subsection (1)(a): Homeowners along marine shorelines cannot design their own systems. This change parallels the change to -0250 (Item #8) that will prohibit homeowners on a marine shoreline from installing their own system.

Cost: Due to a licensed designer being required, cost will increase for a homeowner that would have designed her/his own OSS. This increase will be in the range of $250 to $2,000. After talking to several local health jurisdictions, DOH does not believe many system owners on marine shorelines actually attempt to design their own systems. Therefore, it is anticipated the impact on cost should be minimal.

Benefit: This will assure that professionals with the appropriate expertise design systems that are typically more complex and located in sensitive areas. This should result in a lower risk of contamination due to poorly designed systems. This should also reduce the cost to local health jurisdictions because their review will take less time – less scrutiny, less assistance/information.

Address sewage quality

Historically, a system has been sized looking primarily at the quantity of sewage anticipated to be generated on a daily basis. This is not changing. However, sewage quality, including parameters such as organic matter, solids, oils and greases, nutrients, and pH, does impact how an OSS functions, what risk the sewage poses to a specific site, and what levels of treatment may be appropriate. Thus, it is important that sewage quality be considered by the design

professional when gathering data on a site. Quality is considered in most cases if appropriate information is known. The requirement for evaluating quality in the design of each system is being added to assure it won't be overlooked.

In subsection (2) (e): the designer must address sewage quality for all designs.

Cost: Designers will be required to gather more information in most cases. This may result in a minor increase in the cost (up to $50 or more, depending on source of wastewater) of the design for system owners.

Benefit: Accounting for sewage quality in addition to quantity is critical to assure proper selection of a system and its components. This will minimize the potential for systems to fail.

Address nitrogen Nitrogen is a nutrient found in wastewater. As discussed previously in this document, nitrogen can result in both public health and environmental quality concerns. Some sites are more sensitive to the potential impacts of nitrogen. This is especially true in areas with relatively shallow aquifers with no protective layers between the ground surface and the ground water, as well as along marine shorelines. Such areas will be identified by a variety of means, including in local management plans developed by local health jurisdictions in counties that have marine shorelines, as per subsection (2)(e)(i)(D). Where nitrogen has been identified as a contaminant of concern, it must be addressed in the design.

Cost: One option for handling nitrogen to reduce it through treatment. The additional cost over the cost of a system that otherwise would have been required is estimated to be $0 –$3,000, depending on which options a designer selects for a given situation. If space is available to allow dilution though bigger land area, a less costly option may be available. The number of systems impacted by this proposed revision cannot be determined.

Benefit: Nitrogen can pose a risk to public health in drinking water. The benefit of this change is the assurance that public health risks due to nitrogen are properly minimized.

Require higher treatment level As soils become shallower or coarser, concerns for treatment increase. Using a technology providing a higher level of treatment (meeting a more restrictive treatment level) for that site is important. Some sites will require a higher level of treatment than required in the

current rules. Such sites, noted in Table VI, include those with a vertical separation of 12-18" of soil type 1 or a vertical separation of 24-36" of soil type 2.

Cost: Because higher levels of treatment will be required, the cost of the OSS will increase. The estimated cost increase will range between of several hundred to several thousand dollars depending on the system selected by the designer. The number of systems impacted by this proposed revision cannot be determined.

Benefit: Conclusions were reached that the current rules did not require sufficiently high levels of treatment on some sites with coarse, shallow soils. The proposed revisions require higher levels of protection for those sites. The risk for waterborne diseases, exposure to sewage, or ground/surface water contamination will be reduced.

Require lower treatment level

As vertical separation (unsaturated soil below a drainfield) becomes greater, treatment provided by the soils should increase. This reduces the level of concern, even in coarse soils, such as those in soil type 1. Sites with greater vertical separation may get by with less expensive technology than more sensitive sites. Table VI in the proposed rules allows a lower treatment level than required by the current rules when there are at least 60 inches of soil type 1.

Cost: There may be a reduction in system costs, depending on the options selected by the designer. The number of systems impacted by this proposed revision cannot be determined.

Benefit: Costs may be lower, with public health protection still being adequately provided

Less complex distribution

The simplest and least expensive method of distribution in a drainfield is gravity. It does not result in equal distribution of effluent throughout the length and breadth of the drainfield. Pressure distribution provides more uniform distribution helping to assure good treatment in shallower soils. However, it is more complex and more expensive.

The current rules require gravity or pressure distribution depending on the specific site conditions. For some sites, table VI in the proposed rules will allow gravity distribution where the current rules require pressure distribution. One such site would be one having a vertical separation of at least 60 inches of soil type 2.

Cost: The cost will be reduced by $1,000 to $2,000 per system. The number of systems impacted by this proposed revision cannot be determined.

Benefit: Cost will be lower, while public health will still be adequately protected.

Timed dosing required

There are two different variations of pressure distribution. One, called "timed dosing," controls the amount of sewage that can be sent to the drainfield in a single day. Time dosing eliminates one of the reasons for failure: A drainfield with effluent transmitted to it using "timed dosing" does not fail due to too much liquid (hydraulically overloaded).

Table VI in the proposed rules requires timed dosing for some sites (where technology meeting treatment levels A or B are required). Technologies meeting treatment levels A or B must be used on sites where the soils have limited ability (shallower, coarser) to adequately treat effluent percolating through it. For some technologies (e.g., an intermittent sand filter system), timed dosing is currently required in the DOH guidance documents, and is the current standard of practice for those technologies around the state.

Cost: Costs for timed dosing will increase the cost of a system by an estimated range of $500 - $1,000 over a pressure distribution system not using it. The actual cost increase for a given situation will depend on which options are selected by the designer. For those technologies where the standard of practice includes timed dosing, there will be no cost increase. The number of systems impacted by this proposed revision cannot be determined.

Benefit: The proposal reduces the risk of a failure (surfacing, backing up, contamination of ground/surface water) due to hydraulic overloading of a drainfield. Preventing the possibility of hydraulic overloading of the system helps assure more consistent treatment, thereby helping to assure better public health protection.

Disinfection not permitted

As discussed in item #3 in the "Product Development and Registration" section, the proposed treatment levels include a level for the primary health indicator – FC. There are a number of methodologies available to reduce the number of FC colonies, including components that disinfect using chlorine, ozone, or UV. Item #3 in the "Product Development and Registration" section also discussed the technical and operational difficulties these technologies

have experienced. That was a reason why testing is being required.

Because of the technical difficulties, subsection (2)(g)(ii) of the proposed rules restrict chlorine, ozone, and UV from being used to meet:

- Treatment Level C – there are other technologies that can meet the FC values that don't have the same current technical problems
- Treatment level A & B in type 1 soil – the public health concern is great because of the coarse nature of soil type 1.

Cost: The effect of this restriction will be a decreased set of options for designers and system owners. It is anticipated system cost will increase due to systems that provide bacteriological reductions without chlorine, ozone, or UV being required. For example, a system that will require treatment level A in type 1 soil could see an increase of up to $3,000 compared to the current cost of a system using disinfection. This cost will vary depending on the options selected by the designer. The number of systems impacted by this proposed revision cannot be determined.

Benefit: Because of the on-going problems with the performance of UV and chlorine disinfection, the RDC recommended restricting its use until it is improved and until on-going maintenance can be better assured. This change will assure an OSS meets the FC values without having to use a technology that displays difficulty in performing. The RDC and TRC considered the risk to public health and ground/surface water quality too great to continue to allow these types of disinfection.

Using vertical separation to determine treatment level

One of the most critical determinations a designer must make on a site is the amount of vertical separation. This, together with soil type, is a primary factor in determining the Treatment Level required for the site. Within the one to five feet or more of vertical separation mentioned in Table VI of the proposed rule, there usually are layers of soil that differ in coarseness, as well as different sand, silt, and clay contents.

The current rules do not include a requirement (or contain any suggestions) as to what soil layer is to be used to determine which Treatment Level is to be used. Subsection (3) of the proposed rules answers this issue. The proposed revisions state that the coarsest soil -- that is, the soil type that has the lowest number (of soil types 1 through 6) within the determined vertical separation-- establishes the required Treatment Level. The change will assure the soil type,

within the selected vertical separation, that has the least capacity to treat sewage will be the determining factor in deciding the required treatment level.

Cost: It is anticipated this proposed change in rule language reflects the current standard of practice throughout the state. No impact on cost is anticipated where this is true. In an area where this is not the case, an OSS may cost more if a higher level of treatment would be required. The actual cost increase would depend on how variable the soils actually are and which option is selected by the designer. This cost would range between several hundred dollars and several thousand dollars.

Benefit: With the coarsest soil providing the greatest concern for public health protection, it is the soil that should indicate what level of treatment (Treatment Level) is necessary. Public health, as well as ground and surface water, will be better protected.

5. Design Requirements – Wastewater Tanks: New section -0232 (formerly contained in section -11501)

Description

A septic tank is the simplest and least expensive treatment process in a typical OSS. Its primary purpose is to reduce the solids in the effluent discharged from the tank. This protects the expensive, downstream portions of an OSS (for example, the drainfield) from plugging by solids.

The level of solids removal is a function of several tank characteristics, including how long the sewage remains in the tank, being subjected to various physical, biological, and chemical processes. The current suggestion nationally is to have a minimum volume of 24 hours flow (one day's design flow) available when the tank is ready to be pumped. This leads to minimum liquid volume requirements of two to three days of storage when a tank goes into use.

The proposal increases the size requirements of septic tanks serving a residential source other than a single family residence (e.g., duplex or fourplex) and a non-residential source (e.g., restaurant, strip mall).

Proposed changes with anticipated costs & benefits

Residential tank size, other than single family The proposed rules provide a minimum tank sizing criterion that results in a liquid volume just over two times the daily design flow, an increase from 1.5 times the daily flow specified in the current rules. This will increase the size of these tanks by approximately 33%.

Cost: Septic tank manufacturers were consulted to determine the effect on cost. Depending on the size of the tank and the specific manufacturer, the change could result in an increase of $100 – $1,100 in the cost of concrete tanks for systems serving multi-family housing. Fiberglass tanks are expected to increase of $750 - $2,500.

Benefit: The benefit of increased size tanks is assuring sufficient removal of solids in the sewage by the tank, thereby providing greater protection to the considerably more expensive downstream system components such as the drainfield. Ultimately, this change will increase public health protection by decreasing the risk of sewage surfacing or backing up due to a system failure caused by a tank not removing sufficient solids from the sewage stream. Additionally the proposal helps increase the probability of a longer life for the downstream components.

Because of greater retention time in the tank and, consequently greater time for solids to be reduced, a tank may have to be pumped less frequently. The proposal may result in a cost savings to the OSS owner. To give some idea of cost savings, pumping a 1,000 gallon septic tank usually costs between $200 and $300.

Non-residential tank size The current rules do not have a requirement for sizing tanks for non-residential sources of sewage. DOH assumes most designers are following the guidance for residential sources other than single family, currently 1.5 times the daily design flow.

The proposed rules require a minimum liquid volume of three times the daily design flow, resulting in an increase of 100%.

Cost: Septic tank manufacturers were consulted to determine the effect on cost. If designers are currently using 1.5 times the daily design flow, this proposal could mean an increase of $500 - $2,500 for a concrete tank, depending on the size of the tank and the specific manufacturer. For fiberglass tanks, the increase could be $600 - $7,000 per tank.

Benefit: The benefit of increased tank size is assuring sufficient removal of solids in the sewage by the tank, thereby providing protection to the considerably more expensive downstream system components such as the drainfield. Ultimately, this change will increase public health protection by decreasing the risk of sewage surfacing or backing up due to a system failure caused by a tank not removing sufficient solids from the sewage stream. It also helps increase the probability of a longer life for the downstream components.

Because of greater retention time in the tank and, consequently, greater time for solids to be reduced, a tank may have to be pumped less frequently. This may result in a cost savings to the OSS owner. To give some idea of cost savings, pumping a 1,000 gallon septic tank usually costs between $200 and $300.

6. Design Requirements – Soil Dispersal Component: New Section -0234 (formerly contained in section -11501)

Description

A drainfield is sized to handle a number of gallons per square foot of drainfield area each day. This is called a hydraulic loading rate. The size of a drainfield is dependent on the soil type and the daily design flow of sewage using the specified hydraulic loading rate.

Proposed hydraulic loading rates (in Table VIII) are slightly different from those in the current rules (Table V). These proposed revisions, in combination with item #3 (the changes to soil types in section –0220) may require increased drainfield sizes for some soil types. The cost and benefit were discussed in that section (item #3).

The changes considered below are those changes other than the changes to the hydraulic loading table.

Proposed changes with anticipated costs & benefits

Using finest texture soil to determine hydraulic loading rate

One of the most critical determinations a designer must make on a site is the amount of vertical separation. This is a primary factor in determining the Treatment Level required for the site. Within the one to five feet or more of vertical separation mentioned in Table VI of the proposed rule, there usually are layers of soil that may have different sand, silt, and clay contents, as well variable coarseness.

The current rules do not include a requirement (or contain any suggestions) as to what soil layer is to be used to determine which loading rate is to be used. Subsection (1)(b)(ii) of the proposed rules answers this issue. The rules state that the finest textured soil, which is the soil type that has the highest number (of soil types 1 through 6) within the determined vertical separation, establishes the required hydraulic loading rate. This will assure that the soil type within a vertical separation that has the lowest permeability will establish the hydraulic loading rate.

Cost: This change has the potential to decrease the loading rate and, therefore, increase the size of the drainfield. This would increase costs by a range of $100 to $1,000 or more depending on the soil

types. However, based on discussions with local environmental health staff, DOH expects that this is not a change from current practice in most local health jurisdictions. The number of systems impacted by this proposed revision cannot be determined.

Benefit: This change increases the probability of long term life of systems by making sure the drainfield is sized based on the most restrictive/least permeable soil found in the selected vertical separation. This will decrease the risk of sewage backing up or surfacing.

Timed dosing required for larger OSS

Timed dosing is an option when designing a pressure distribution system. Timed dosing distributes the sewage to the system at regularly scheduled intervals, and therefore prevents a drainfield from being overloaded with too much sewage, in case there are peak flows or extremely leaky plumbing fixtures or tanks.

For systems handling daily design flows of 1,000 gallons to 3,500 gallons, special requirements exist because of the greater flows and the anticipation that more people will be affected by a problem, if one occurs. One of those special requirements in the current rules is pressure distribution. The change in the proposed rules, found in subsection (1)(d)(iii), will require timed dosing.

Cost: Adding timed dosing will increase the system cost. Cost will be variable depending on system size, number of fields, etc. but additional cost is anticipated to be $1,000 or more per system. Additional cost is due to a more sophisticated pump control system and, potentially, additional pump chamber volume. The number of systems impacted by this proposed revision cannot be determined.

Benefit: A system of this size presents a greater public health risk than one serving a single family residence, as a greater volume of sewage is involved. Timed dosing is being required for large OSS handling more than 3,500 gallons per day. It is critical to reduce the risk of system failure caused by being hydraulically overloaded. Preventing the possibility of hydraulic overloading of the system helps assure more consistent treatment, thereby helping to assure better public health protection. Timed dosing also protects the system owner's investment and reduces the need for repairs or replacement.

Subsurface drip system requirements

A subsurface drip system is a specialized pressure distribution system. It is more expensive and more complex. Currently, all the detail and requirements for this type of system are in DOH guidance

documents. Because there are special requirements for this type of system, and because they can be used where pressure distribution systems can be used, some requirements for subsurface drip systems are in subsection (2) of the proposed rule. Others are left in guidance.

Cost: There are no new costs associated with this addition to the rule, because it moves the current guidance for this technology into the rule. This is an option that is available to designers. No site will require it. It is more complex and costly than pressure distribution.

Benefit: This change clarifies specific requirements when subsurface drip systems are used. Understanding of this technology has evolved since the last time the rules were revised to the point that the requirements are now appropriate to place in rule.

Cleanness and depth of gravel

Gravel is used in many drainfield trenches or beds (a trench three to ten feet wide). If the gravel is not clean, the dirt or solids on the gravel fragments can wash down to the bottom of the trench or bed and plug up the soil, into which all the effluent is designed to flow. A standard, currently in DOH guidance documents, is being moved into the proposed rules.

There is also a standard of practice for the depth of gravel in a trench or bed. This standard of practice is being placed in the proposed rules to help clarify the minimum depths of gravel.

Cost: There should be no new costs for either change because these are industry-recognized standards. Additionally, the standard exists in guidance documents or has been the general standard of practice.

Benefit:

- Clean gravel will minimize the potential of sealing off the soil below the gravel, helping to minimize the potential of backing up or surfacing of sewage.
- The change creates consistency for the depth of gravel below the pipe.

Effect of cleaner effluent on hydraulic loading rate

The hydraulic loading rates used to size a drainfield are based on septic tank effluent quality. Research has shown that soil can accept greater amounts of effluent if the effluent is treated to provide a better quality of effluent than septic tank effluent.

While the current rules do not address cleaner effluent, DOH guidance allows increases in the hydraulic loading rates when cleaner effluent is discharged to the drainfield. This allowance is being

added as subsection (7) of the proposed rules (the standard for this quality is included as Treatment Level D). The resulting drainfield size is smaller, therefore there will be less cost for materials and installation. However, the required land area does not change because the total area for the full-size original drainfield plus the reserve area is still required. This change does not reduce the area that must be set aside for the primary and reserve OSS.

Cost: No new costs are anticipated for this change. There should be a reduction in installation costs ($500 - $1,000+), as the primary drainfield will be up to 33% to 50% smaller, depending on the soil type, than would be required if septic tank effluent was used.

Benefit: The changes reduce installation costs without compromising public health protection.

Minimum installation depth Effluent flows from a drainfield into the soil from the trench or bed. To minimize the potential of effluent flowing over the soil's surface, a portion of the trench or bed sidewall is currently required to be installed into original, undisturbed soil. Subsections (2) & (3) of the proposed rules specify that all drainfields must be installed at least 6 inches into original, undisturbed soil.

Cost: This is not a change for a drainfield using gravel. For a drainfield using gravelless or subsurface dripline distribution technologies, this requirement is currently specified only in guidance

Benefit: The change minimizes the potential for effluent to short circuit the bottom infiltrative surface in a drainfield trench or bed and bypass the treatment zone in the soil and surface on the ground's surface.

7. Design Requirements to Facilitate O&M: New Section -0238 (formerly contained in section -11501)

Description

O&M stands for operation and maintenance. An OSS has a much greater potential of a long life and good performance if it is used (operated) and cared for (maintained and monitored) properly. The designer can make O&M much easier if s/he designs access points into the OSS, to facilitate maintenance and monitoring.

O&M is critical to the ongoing function of every OSS. By addressing routine maintenance problems before they lead to a system failure, the probability that the life of the system will be extended and public health protected increased. Requiring at-grade access for all systems helps

ensure that O&M will occur. Systems that are buried below ground are more difficult to service because they have to be located and dug up in order to determine how the system is functioning and if it needs service. Systems brought to final grade are much simpler to find and service and, therefore, more likely to be serviced.

The current rules have access requirements for septic tanks and pump chambers. DOH guidance documents contain requirements for access to all other systems and system components, as well as the requirement for warning and diagnostic devices on OSS using pumps. Some of the requirements to facilitate O&M are being moved from guidance to the proposed rules.

Proposed changes with anticipated costs & benefits

Requirements for Access devices, and diagnostic tools

To facilitate monitoring and maintenance, the proposal adds surface access requirements for all OSS and their components, except for septic tanks with a gravity drainfield (minimum of 6 inches of cover are allowed). This is at the local health officer's discretion. If access to the surface is not provided for a septic tank, an at-grade marker must be installed.

Warning devices/alarms and diagnostic tools (event counters, elapsed time meters) are required for OSS using pumps.

Cost: There are additional costs to construct a system with risers to the surface. For septic tanks, increased costs are estimated to be $100 to $200 per riser. As the system gets more complicated, more risers may be necessary, increasing the cost. The cost of risers needs to be compared with the cost of uncovering a tank (digging holes down to the tank lids) each time the tank is evaluated.

Pumps with alarms are already an industry standard. Pump systems with diagnostic tools are becoming an industry standard. Current DOH guidance recommends they be included. If they are not currently being used, the simplest tools will add $50 to $100 in initial cost.

Benefit: Accessible system components have a greater potential of being looked at. If this leads to O&M being routinely done, the probability of a longer-term lifespan increases. Thus, the system owner is expected to save money in the long term.

As access to the OSS becomes easier, evaluating OSS components is also easier. If routine monitoring is done, differences between one inspection and the next can be noted. Problems may be found before a failure occurs, and can usually be corrected with much less cost than if a failing system has to be repaired. Specific benefits include:

- Risers to the surface will allow the OSS owner to avoid the costs

of uncovering the tanks each time the OSS is to be evaluated. The estimated cost for a pumper to do this work is $50 to $80 per access hole, depending on the depth of the hole.

- Alarms notify the system owner if a problem with the pump is occurring, allowing a problem to be evaluated and fixed before sewage backs up or surfaces.
- Diagnostic tools assist someone monitoring or troubleshooting an OSS to know more about OSS performance, helping an individual to determine how the system is functioning and/or to find causes of problems.

All these changes help to reduce the risk from failing OSS.

8. Installation: now -0250 (formerly section -14501)

Description:

Marine shoreline sites are typically considered more sensitive than many other sites, many having shallower soils. Also, shoreline waters, due to their varied use as shellfish growing and/or recreation areas add to the sensitivities. Many times, more complicated systems using higher levels of technology are required. Because of this, it was concluded that only certified installation professionals should be able to install OSS in these areas. In subsection (1) (a) of the proposed rules: Homeowners along marine shorelines cannot install their own systems.

A state-licensed designer is responsible for designing a system. When an installer is installing an OSS and finds an error or something else that may cause the installation to vary from what was approved in the design, the proposed rule (subsection (3)(c)) requires the installer to get approval for the changes to the design.

Proposed changes with anticipated costs & benefits

Limitation on marine shoreline installation Homeowners are allowed to install their own systems. Because of the increased sensitivity in marine shoreline areas, it is important to assure an OSS is installed properly. Thus, the proposed rule requires a marine shoreline homeowner to hire a person approved by the county to install the system. This change parallels the change to section 0230 (Item #4) that prohibits homeowners on a marine shoreline from designing their own systems.

Cost: Placing limits on homeowner installation will increase the cost for those homeowners along marine shorelines who would have attempted to install their own system. The materials and equipment used to install the OSS will be the same, regardless of who installs the OSS. The cost increase is for contracting with a certified installer to install the system with his/her own crew and equipment. The estimated increased cost may be as high as several thousand

dollars. However, after discussions with environmental health directors, DOH believes very few homeowners in these situations have been installing their own systems.

Benefit: The proposal will assure professionals with the appropriate expertise install systems that are typically more complex and located in sensitive areas. As a result, there is a lower risk of contamination due to poorly installed systems. Additionally, this change should reduce the cost to local health jurisdictions because their review and inspections will take less time and require less technical assistance to homeowners.

Approvals for design changes The rule currently requires installers to follow the approved design without deviation. However, this requirement is not always followed in the field. This proposed rule revision allows for changes to be made in the field, consistent with the RCW and WAC that establish the Department of Licensing requirements for the practice of design. Only a licensed designer can practice design, which includes making changes to designs.

Cost: The change creates a method for allowing changes to the design to be made in the field. Thus, there should be no new costs associated with this change. However, the department recognizes that many installers have been regularly making changes without any approval. Therefore, installers may perceive the requirement to get approval from the designer and local health jurisdiction as imposing an increased cost. Contacting the designer and local health officer will take time away from installation and increase installer costs, which will most likely be passed on to their customer.

Benefit: Recognizing that changes to the design are sometimes necessary, this proposal creates flexibility for making changes in a way that is also consistent with Dept. of Licensing requirements. It will help assure that any changes are consistent with the thought process used by the designer and the requirements in the rules. This will add to the quality control of OSS installations. Additionally, this requirement should reduce the installer's liability.

9. Record drawing: New Section -0265 (formerly contained in section -14501)

Description

A detailed drawing of what was installed, especially noting items that are different from the approved design, is extremely useful, if it is accurate and of good quality. The drawing provides a final record of what is in the ground.

The current rules require an "as-built drawing," but do not include any detail about what should be included. The proposed rule changes the name of the document to "record drawing" and specifies the minimum detail that should be included.

The current rules also allow the local health officer to specify who will do the drawing, the designer or the installer. However, the statutes and rules dealing with activities of designers indicate that this activity falls under the definition of OSS design. To avoid any conflict, DOH removed language regarding "who" may prepare a record drawing.

Proposed changes with anticipated costs & benefits

Requirements for record drawings Inadequate as-built drawings have been a problem when homeowners try to add on to their homes or construct a patio or other structure. In the absence of an accurate record describing the OSS location, parts of the OSS can be damaged because the OSS owner is not aware of its location.

Cost: For some designers, the detail being required is already their practice. For designers who do not complete drawings to this specificity, the proposed additional detail will increase the time to develop, and consequently, the cost of the record drawing preparation. The department estimates the required detail could increase the time to prepare a record drawing by an average of two hours. A designer's time is estimated to be in the range of $50 - $125 an hour making the total estimated increase in the range of $100 - $250.

Benefit: The benefit to public health comes by preventing damage to systems that can occur because the location is unknown. Benefits to system owners include the improved ease of locating their system for maintenance or repair without having to dig up the entire yard. As a result, an OSS owner will avoid accidentally damaging their system while looking for it or doing some other activity. Having a detailed record on file with the county may also help create a data base of accurate information to be used by local health jurisdictions.

Removing direction as to who can prepare a record drawing

The proposal removes the allowance for local health officers to specify that either the designer or the installer may prepare the record drawing to eliminate any conflict with chapter 18.210 RCW and the standards of practice for OSS designers. The definition of onsite sewage design includes preparing the record drawing and therefore allowing the installer to do this activity is in conflict with these statutes and rules.

Cost: There should be no new cost associated with this change because the proposal is silent about who does the record drawing. However, assuming local health jurisdictions enforce the Department of Licensing's requirements, there may be an increased cost associated with the designer preparing the drawing. This is because preparing the record drawing represents a separate trip out to the site for the designer.

Benefit: This change creates consistency with Department of Licensing requirements and helps to ensure that designers, the professionals with the appropriate training, prepare the record drawing.

10. Repair of failures: Section -0280 (formerly section -16501)

Description

Upon failure of an OSS, the system must be repaired. While some flexibility has existed historically, to create some incentive to help get repairs made it is imperative that health and ground/surface water be adequately protected when flexibility (reduced vertical and horizontal separations) is allowed.

This section provides mitigation options, ranging from 1) replacing the failing system with an OSS that meets new construction requirements to 2) connecting to public sewer to 3) vacating the premises served by the failing OSS. Both the current and proposed rules provide an option when the repair can not meet current depth of soil or horizontal setback requirements. This usually entails using a more expensive system with a higher level of treatment to compensate for the OSS site's limitations. None of the sites reflected in this table would support the construction of an OSS that met new construction requirements. The proposed rules make revisions to better protect public health. Higher levels of treatment due to a site's increased risk (reduced vertical and/or horizontal separations) are required in some instances.

The proposed rule makes changes to the table (currently Table VI, proposed Table IX) that incorporate the new treatment levels and method of distribution for the various soil types, vertical separations, and horizontal setbacks.

Proposed changes with anticipated costs & benefits

Modified repair table

There are a number of modifications to the repair system table. These include the addition of specific soil types (soil types are not mentioned in the current rules), incorporation of the new treatment levels, and revision to treatment requirements in certain situations. The TRC and RDC concluded that the current table does not provide adequate protection in some scenarios.

The proposed Table IX has numerous cells within it, each reflecting a different scenario. Most scenarios are caused by the addition of soil types into the table. In the first three columns (< 25 feet, 25-50 feet, 50-100 feet), there are a total of 45 cells (only nine in the current rules). This change makes the table much more complicated.

Cost: Determining the effects of all the changes in this section is difficult because of all the potential scenarios. No change is proposed for the scenarios in 22 of the 45 cells in the first three columns of the table. In the other 23 cells, an increase in cost will most likely occur, since an OSS providing a higher level of treatment will be required. Changes in 7 of these cells are due to concerns in type 1 (very coarse) soil, which are not singled out in the current rules. The other changes are due to concerns for coarseness of soils in combination with the shallowness of soils, both which provide treatment concerns.

Again, in all these scenarios, there are reduced horizontal and/or vertical separations, scenarios that would not allow an OSS for a new house to be constructed on that parcel. The additional cost is estimated to range from $2,000 to $15,000 depending on the specific site conditions and the option selected by the designer. The number of systems impacted by this proposed revision cannot be determined.

Benefit: With the reduced horizontal setbacks and vertical separations, a greater need for protection was deemed necessary since they are directly related to providing adequate protection of public health. Soil directly affects treatment capability and the system design required to provide adequate sewage treatment. All of the changes intend to provide increased assurance that the risk to public health and ground/surface water contamination will be minimized by assuring OSS meet treatment levels that are commensurate with the risks posed by the sites.

Requirements for sites with horizontal separation >100

The current rule provides no requirements for situations where there is a horizontal separation of 100 feet, but there is little or no soil to provide adequate vertical separation. The proposed rules have specific requirements for such sites having less than 12 inches of

feet vertical separation.

For very shallow soils, even if a horizontal setback of greater than 100 feet exists, there are significant concerns that proper treatment, especially pathogen removal, will not occur if sufficient soil depth is not available to assure removal of pathogens.

Cost: For sites that fit this situation, the current rule requires that the site meet the rule to the maximum extent possible. There is no treatment level requirement, even though a system could be theoretically installed on a site with little or no soil. The proposed rule will require a system with an increased cost of $2,000 - $5,000 or more (a technology that meets treatment level B is required). This will be dependent on which option is selected by the designer. The number of systems impacted by this proposed revision cannot be determined.

Benefit: The proposed rule provides greater assurance that adequate treatment will occur due to the requirement for a technology that can assure specific FC values. As a result the rule provides grater public health, ground water, and surface water protection in these situations.

Reduce nitrogen discharge Nitrogen is not mentioned in the current rules, including the current repair section. The proposed rule requires the nitrogen discharge, in areas where nitrogen has been identified by the local health jurisdiction as a contaminant of concern, to be minimized.

Cost: The number and locations of areas where nitrogen will be identified as a contaminant of concern is not known, as this is part of the local management planning process. In those areas, different nitrogen reduction strategies will be available. The additional cost of nitrogen reduction over the cost of a system that otherwise would have been required is estimated to be $0 –$3,000, depending on which options a designer selects for a given situation.

Benefit: In areas where nitrogen can have an adverse impact on ground water, public health will be better protected by assuring a technology will be used that will lower nitrogen concentrations.

Disinfection not permitted Concern for protecting public health increases as vertical separation in soil decreases. There must be assurance that the FC concentration reductions in effluent discharged to these shallow soils do occur. The current rules allow disinfection to be used to meet <u>all</u> treatment standards. However, disinfection technologies using chlorine or UV are not currently reliable. Thus, disinfection via chlorine or UV

cannot be used for a repair when there is less than 12 inches of vertical separation.

Cost: A more expensive system will be required in lieu of systems that incorporate disinfection. The actual additional cost, ranging from $2,000 - $5,000+, is dependent on which technology is available and selected to reduce the FC concentrations to sufficient values. The number of systems impacted by this proposed revision cannot be determined.

Benefit: The proposal improves public health protection in high-risk situations because unreliable technologies are prohibited.

Timed dosing required The benefits and effects of timed dosing have been discussed earlier (page 49). Pressure distribution is required whenever site requirements require the use of the repair table in selecting an appropriate system. The proposal adds a requirement for timed dosing in all cases.

Cost: The proposed change increases the cost of systems between $500 and $1,000, depending on system size, the control panel used, and the system selected by the designer. Some technologies already have timed dosing built into the technology and will result in no extra cost if they are selected by the designer. The number of systems impacted by this proposed revision cannot be determined.

Benefit: The proposal minimizes the risk of a failure (surfacing, backing up, contamination of ground/surface water) due to hydraulic overloading of a drainfield. Preventing the possibility of hydraulic overloading of the system helps assure more consistent treatment, thereby helping to assure better public health protection.

11. Developments, Subdivisions, and Minimum Land Area: Section -0320 (formerly -20501)

Description

Lots, parcels, or tracts must be large enough to assure everything desired by the property owner, including the OSS and a reserve area, can fit within the boundaries. If that lot, parcel, or tract is served by an individual well, the land area must be larger, to provide an adequate protective radius around the well. The current rules primarily use this philosophy in establishing the required land areas on a parcel that needs an OSS. Proposed changes in the rules are intended to not only provide sufficient area for everything to go on a lot, but also to provide sufficient land area and ground water volume below it to help dilute nitrogen, to minimize the accumulations of nitrogen concentrations in the ground water below a development.

Both the current and proposed rules provide two methods for determining the required minimum land area for a parcel on which an OSS is to be installed. Method I provides a "cookbook" approach to minimum land area determination. It is summarized in a Table (Table VII in the current rules, Table X in the proposed rules). Method II provides a way minimum land areas can be reduced down to an absolute minimum, requiring the development of a report that technically justifies the reduced land areas.

The proposed rules revise Method I, but still allow a Method II report to be done to reduce the land areas to the current minimums.

Proposed changes with anticipated costs & benefits

Increased minimum land area for public water supplied lots

The proposal increases the minimum land area in Method I for lots served by public water with soil types 2-6. The primary purpose is to provide greater dilution of nitrogen in the groundwater below the lot. Thus, land areas in new subdivisions to be served by public water will be larger, unless a Method II analysis justifies smaller land areas. A Method II analysis can justify land areas consistent with the minimum land areas contained in the current rule.

In most counties, this change will not have much affect due to growth management planning and land use planning land area requirements already in effect. The department anticipates the primary effect of this change will be an increase in the number of Method II analyses.

Cost: The costs of this proposed revision are variable and difficult to predict. A provision in both the current and proposed rules effectively grandfathers most existing lots of record from the minimum land area requirements. There will be no additional costs for these lots.

For those land parcels that are affected, a Method II analysis may be used to justify a smaller land area (down to the minimums permitted under current rules). It is anticipated there will be a greater number of Method II analysis performed, where local planning allows smaller lots. Based on discussions with private contractors and local health officials, DOH estimates that this analysis is likely to result in additional costs of up to $1,000 - $5,000 for the developer and up to $1,000 for the local health officials. The actual cost depends on the detail demanded by a particular area and whether a licensed hydrogeologist will be required to complete the analysis. (The local health jurisdiction cost increases will likely be passed on to developers in the form of higher permit fees, and ultimately to building owner.)

If nitrogen is identified as a contaminant of concern in the area

containing the parcel, one of the results of a Method II analysis may be the need to treat sewage to reduce nitrogen before discharging it to the drainfield. In this case, the increased cost is estimated to be $0 - $3,000 over the cost of a system that would have otherwise been required. The actual cost is dependent on site and soil characteristics, as well as the specific option selected by the designer.

Benefit: By increasing the land area needed for each OSS, there will be a greater dilution of nitrogen in the ground water. The risks posed by nitrogen have already been discussed in this document. The benefit is preventing costs associated with methemoglobinemia, ground/surface water quality remediation, water supply treatment, and environmental damage resulting from contamination.

Reduced minimum land areas for individual water supplied lots

As soil types get finer textured (move toward soil type 6), the loading rates decrease and the drainfield sizes increase. With soil types 5 and 6, as long as the unsaturated soil depths are adequate, treatment is usually not a concern. Thus, for fine textured soil, the RDC and TRC concluded that the current two acre minimum was not needed for public health protection. Both bacteriological removal and dilution of nitrogen will be sufficient under the new requirement of one acre.

Cost: The decrease in minimum land area for lots containing soil types 5 and/or 6 and served by individual wells will not affect costs for affected parties. For lots with these soil types, a developer may be able to create more lots out of proposed subdivision, than under the current rules.

Benefit: For a new subdivisions in these soil types and served by individual wells, more lots may be developed without compromising public health.

Local Management and Regulation/Operation & Maintenance

Once an OSS is installed, it is expensive to change and more difficult and intrusive to regulate. For this reason, one primary philosophy behind the proposed rules is to locate, design, and install OSS using technologies that provide levels of treatment commensurate with the levels of protection demanded by a site. This is done to maximize the life expectancy of the system, reduce the probability of failures, and to better protect public health.

Local health jurisdictions have historically spent the majority of their regulatory effort in the OSS program assuring that OSS are properly located, designed, and installed to prevent

problems later. However, as an OSS gets older, proper use and care become even more important to keep the system functioning. Tens of thousands of OSS installed more than 15-20 years ago cannot be assumed to be providing adequate treatment, as the intent for many older systems was to keep the sewage below the ground's surface (disposal) rather than providing sufficient treatment. Most agree that older systems pose the greatest amount of risk from a public health and ground/surface water contamination perspective and that O&M programs are the most effective way of dealing with this risk. An on-going challenge faced by local health jurisdictions is how to address this risk in the most economical and least intrusive way.

Counties are not currently required to comprehensively plan for the development of OSS or the management of those systems. Instead, current rules require local health jurisdictions to develop and implement plans to monitor all systems, disseminate O&M information, and provide education to homeowners. Most jurisdictions are not meeting this standard, or are doing it to a limited extent.

The proposed rules attempt to address the risk posed by all OSS, both new and existing by requiring local health jurisdictions to take a comprehensive look at their jurisdiction's OSS development and management needs and begin to develop the necessary information that will assist them in their long-term planning. The proposed rules intend to include both new and existing OSS in this planning process. The requirement for a plan also intends to encourage coordination between local health and local planning agencies.

A two tier approach is proposed with higher risk marine counties required to complete a more extensive plan than lower risk counties. Marine counties are considered to be higher risk because: 1) in addition to the ground and surface water quality concerns, most have shellfish growing areas, 2) a significant portion of the state's population is found in those counties, and 3) much of the shoreline contains soil and site conditions that create difficulty for OSS to properly perform, requiring sophisticated and complex technologies. All plans must be in writing and approved by the local board of health. For lower risk counties, the plan must be written but approval by the local board of health is not required.

1. Areas of Special Concern: Repeal of former section -21501

Description

The current rule encourages counties to identify "areas of special concern" where public health is more likely to be jeopardized or systems more likely to fail and to develop more stringent operation, monitoring, and maintenance requirements. Few counties have identified areas of special concern under the existing rule.

The proposed rules require counties to develop a comprehensive plan. This plan is to identify higher risk areas and to develop additional operation, monitoring, and maintenance requirements commensurate with the risks posed by OSS. These additional requirements can then be incorporated into the local health jurisdiction's OSS operational program.

This section is repealed. However the list of areas has been moved into the Local Management and Regulation section –0015 for consideration by local health jurisdictions as they develop written plans for OSS development.

Proposed changes with anticipated costs & benefits

Repeal of "Areas of Special Concern" Because the allowances in this section were not used, the section is being repealed.

Cost: No cost is anticipated, as areas to protect can be identified in local management plans (discussed in next item) or identified via other existing authority.

Benefit: Concept is still available – detailed in local management plan

2. -02001, now -0015 (Local Management and Regulation)

Description

Currently, WAC 246-272-15501(3) requires local health officers to develop and implement plans to, among other things, "…initiate periodic monitoring of each OSS no later than January 1, 2000; to assure that each OSS owner properly maintains and operates the OSS in accordance with this section…; disseminate relevant operation and maintenance information…; and, assist in distributing educational materials to OSS owners." This subsection is being repealed and replaced with a two-tier local planning framework.

- Tier 1- For counties with marine shorelines, the planning requirements are expanded and now include overall management, development and siting of OSS as well as O&M. The plan must be adopted by the local board of health within 2 years of rule adoption and reviewed by DOH. The proposal directs these local jurisdictions to:
  - Evaluate their jurisdiction to find high risk areas – particularly those areas from the Areas of Special Concern section (-21501) and those where nitrogen may be a contaminant of concern;
  - Identify additional requirements for O&M;
  - Develop an inventory of all known systems;
  - Describe their plan and capacity to maintain records of O&M and enforce rules for O&M;
  - Describe their capacity to fund the plan; and
  - Coordinate with other land use plans under Washington's Growth Management Act.
- Tier 2 - For all other counties, the plan requirements for local health jurisdictions are reduced from the current rules. These plans must describe:
  - How the jurisdiction will remind and encourage homeowners to perform the required O&M;

- The jurisdiction's capacity to provide education & O&M information; and
- The jurisdiction's capacity to adequately fund the plan.

Proposed changes with anticipated costs & benefits

Change in management plan requirements

Marine shoreline counties are required to have a comprehensive management plan. Other counties must have a written plan, but the requirements are less stringent than the requirements for counties with marine shorelines, and no greater than what is required in the current rules.

The plan is intended to be a tool for local health jurisdictions to:

- Plan and evaluate their onsite programs;
- Better integrate other agencies planning designations into the onsite program;
- Identify resource needs for effective O&M and other program activities; and
- Be in a better position to respond to regional onsite related activities in a statewide coordinated manner.

The proposed plan formalizes many practices and working relationships already in place. Local jurisdictions track current OSS activities. Some have more extensive O&M programs.
The plans should be done in conjunction with the development of local rules on OSS, to assure consistency between the two efforts.

Cost:

There will be a significant cost to the marine counties.

- Depending on what the local plan, together with local regulations that may be developed, specifies, there also may be costs to constituencies within the local jurisdictions.
- The costs will vary depending on the size and geography of the of the health jurisdiction. Some counties estimate the plan will cost approximately $40,000 for a part time employee for up to 6 months to develop the plan.
- Other costs associated with plan development include public meetings and working with the community to gain input and approval of the plan.

For all other counties the plan requirements are less stringent. The plan requirements are no greater than what is required in the current rules for O&M planning. Thus, there should only be a minimal cost to produce a written plan.

Many counties already have plans developed to address the current rule requirements. To the extent that they can use these plans as a framework for their new plans, costs can be controlled. Guidance to

be developed by DOH will also be helpful in controlling costs for local health jurisdictions as it will provide consistent format and content information.

Further, costs may be partially offset by efficiencies gained through better coordination between OSS development and comprehensive land use planning.

For DOH and other entities interested in reviewing a county's OSS program, there will be savings associated with having all the information in one plan.

Benefit:

- The primary benefit is that a local plan for all aspects of onsite sewage siting, design, and operation will be developed.
- For marine counties the proposed changes enhance the current rule by requiring local health jurisdictions to identify the areas listed in the current list of Areas of Special Concern and to use this information to provide guidance to OSS program activities.
- A benefit of the plan is that it may encourage sharing of information on OSS O&M programs.
- The proposed revisions intend to reduce the number of failures occurring within a local jurisdiction. Reducing the number of failures results in a reduced number of incidences of OSS backing up into structures or surfacing, waterborne disease outbreaks, and contaminated ground/surface water. This results in a significant cost savings to a community.
- As related previously, this also results in a potential long-term savings to the OSS owner, if it results in their system being used and cared for properly for the life of the system.

3. Operation, Monitoring, and Maintenance – Owner Responsibilities: Section -270 (formerly section -15501)

Description

An OSS that is used properly and then cared for throughout its life helps assure it will function properly, last longer, and adequately protect public life and ground/surface water. This section details the OSS owner's responsibilities for proper use (operation) and on-going care (monitoring and maintenance) of their OSS. All the proposed changes (inspection/monitoring requirements, requirements incurred when a property served by an OSS is sold) intend to help assure this and to assure purchasers of property served by an OSS can receive appropriate information.

Proposed changes with anticipated costs & benefits

OSS inspection frequency and detail

The current rules only specify that the septic tank be checked every three years to determine the levels of solids in the tank. If the solids levels get too close to a tank's outlet, and it isn't pumped, solids will flow out to the drainfield, or to the next downstream component, and cause problems.

The current requirement does not adequately address the entire OSS. The tank is only one part of the overall system that can include transport piping, pumps, electronic control panels, disinfection equipment, mechanical treatment components, and the drainfield. All of these components need to be functioning properly.

The proposed rules require an owner with a septic tank – gravity flow drainfield to monitor their system, not just septic tank solids, every three years. For more complex systems with pumps and other parts more likely to require higher levels of attention, annual checks are needed.

The rules allow owners to inspect (monitor) and maintain their own systems. Some counties have more developed O&M programs which already require homeowners to contract with a certified O&M professional for systems of a specified complexity.

Cost: For the purposes of this analysis, the department assumes owners will hire a professional to provide inspections.

An owner of a conventional gravity system can expect to pay $100-$200 every three years to inspect the entire system. This is similar to the cost expected to have an O&M professional just check the solids level in the septic tank every three years. Thus, there should be no cost increase for an OSS owner that is already checking the septic tank in their OSS, consistent with the current rules.

Owners of other types of OSS will see an increase from having their septic tank inspected every three years to having their entire system inspected annually. This will be an estimated increase of $100 to $300 dollars annually, depending on system type and how accessible everything is.

Benefit: The primary benefit of this proposed revision is a more appropriate and thorough inspection of all OSS. This will provide additional benefits including:

- The benefits to public health:
  - Finding problems before a system fails and can surface or contaminate groundwater or surface water; and/or

- Readily finding failing OSS so they can be repaired and stop posing health risks.

- For system owners, regular O&M helps increase the probability of a longer-term life expectancy for their system and a likely decrease in their long-term costs. While there is an on-going cost to properly care for an OSS, there is a strong probability that this will save a significant amount of money (thousands of dollars, maybe tens of thousands considering today's system costs) for the OSS owner over the life expectancy of the OSS.
- For tribal and non-tribal shellfish harvesters, as well as recreational shellfish harvesters, the benefit is finding and addressing problems to prevent closure of shellfish growing areas.

Owner responsibility for disclosure

The proposal requires a system owner to disclose information about OSS changes and maintenance to the buyer.

Cost: The cost will be in the owner's time and storage space for maintaining copies of records.

Benefit: The benefit of requiring the owner to share all known changes and maintenance to the system at the time of property transfer is that the new homeowner will be aware of the system, better aware of what they are purchasing, and assured that the OSS has been checked and appropriately maintained.

Conclusions of the effects of all changes:

In conclusion, the primary benefits of the proposed revisions to these rules are preventing the potential of disease, and the resulting costs that can occur due to inadequate or failing OSS. The proposed revisions all work together to provide multiple barriers to possible disease transmission:

- Product Registration ensures that products demonstrate the ability to meet the treatment standards necessary to protect public health, particularly on very sensitive sites.
- Technical design changes all attempt to fine tune the design and installation of OSS to prevent problems that can lead to failure.
- The local management provisions ask local health departments to plan how they will manage OSS in their jurisdictions. System owners are asked to take responsibility for the long-term operation of their systems by inspecting them and ensuring appropriate maintenance occurs.

The department believes these revisions are necessary to meet the goals and objectives of the applicable statutes. Because of their preventive nature, the department also believes the benefits of the proposed revisions outweigh the costs.

D. Determine, after considering alternative versions of the rule, that the rule being adopted is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives stated previously.

DOH staff worked closely with constituents and the public to minimize the burden of this rule. Over the course of the rule development many ideas were discussed. One of the regulatory trends being discussed nationally, as well as by the RDC, is performance standards versus prescriptive regulations. In general, performance standards are usually considered to be less burdensome to the regulated community because they allow the flexibility to reach a standard in whatever way might be the least burdensome in a particular situation. This is how large sewer treatment systems are regulated. However, performance standards require monitoring to assure that the standards are being met. When considering the amount of monitoring that would need to be done state-wide in order to assure that each OSS is attaining a standard, the burden to both system owners and regulatory agencies becomes prohibitive. For this reason, the department and the RDC continued with a more prescriptive approach to the rules. Systems are designed using 1) the prescriptive requirements outlined in the rules and 2) products that are tested to ensure they have the capacity of meeting a level of performance in a laboratory setting. This approach provides the necessary public health protections without the burden of regularly monitoring effluent coming out of each OSS to assure compliance.

In addition to the consideration given to alternative rule frameworks, such as performance standards, the following alternatives to individual provisions were also considered but rejected as being more burdensome on the regulated community:

Alternative version #1: The original RDC proposal included a requirement that notice to the title be filed along with the final installation permit. This would assure that information regarding the system would pass from owner to owner at the time of property transfer. During the workshops across the state, many stakeholders expressed that this was an overly burdensome requirement and that the time of title transfer was too overwhelming for meaningful learning about an OSS. This requirement was removed and is left to the discretion of the local health officer.

Alternative version #2: The original RDC proposal required that all systems required to use pressure also needed timed dosing. However, this was considered to be an added expense without benefit in some situations. The current rule now only requires timed dosing with pressure where Treatment Levels A & B are required. Compared to this alternative version, the proposed rule is less burdensome for those required to comply with it because systems requiring Treatment Level C or E will not be required to add timed dosing.

Alternative version #3: The original RDC proposal required all health jurisdictions to complete the local management plan. Many counties, particularly those in eastern Washington, responded that this level of planning was not warranted based on the low public health risk posed by OSS in their counties. The current proposal requires an abbreviated plan for lower risk counties.

Alternative version #4: One option that was considered for product registration was NSF certification for alternative systems. However, NSF certification requires on-going monitoring of production processes and regular testing. The proposed rule requires one time testing with retesting only when the product has changed. As a result, the proposed rule is less burdensome on manufacturers.

Alternative version #5: In section -0270 relating to system owner O&M responsibilities, some members of the RDC felt that only professionals should perform OSS inspections and that system owners should be required to hire a professional annually. Further, the RDC discussed the idea of requiring the service professional to file a report with the local health jurisdiction to verify that the inspection was completed. Both these suggestions were ultimately considered to be too burdensome on local health jurisdictions and system owners. The final draft requires that systems be checked but allows homeowners to complete inspections for themselves. Instead of a report filed with the local health jurisdiction, the proposal requires system owners to maintain records of maintenance or repairs and provide the records to the buyer when they sell their property.

E. Determine that the rule does not require those to whom it applies to take an action that violates requirements of another federal or state law.

The rule does not require those to whom it applies to take an action that violates requirements of federal or state law.

F. Determine that the rule does not impose more stringent performance requirements on private entities than on public entities unless required to do so by federal or state law.

The rule does not impose more stringent performance requirements on private entities than on public entities.

G. Determine if the rule differs from any federal regulation or statute applicable to the same activity or subject matter and, if so, determine that the difference is justified by an explicit state statute or by substantial evidence that the difference is necessary.

The rule does not differ from any applicable federal regulation or statute.

H. Demonstrate that the rule has been coordinated, to the maximum extent practicable, with other federal, state, and local laws applicable to the same activity or subject matter.

Yes, the rule is coordinated to the maximum extent practicable with other applicable laws, including the licensure of onsite sewage designers, chapter 18.210 RCW; growth management and land use planning under chapters 36.70 and 36.70A RCW. DOH staff has communicated with staff from the Departments of Licensing and Community, Trade, and Economic Development. The Department of Ecology was represented on the RDC to help assure consistency with appropriate water quality related laws and rules.

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Appendix A
Overview of Costs resulting from changes to design and installation requirements

Although, the list of costs associated with these design and installation requirements appears to be extensive, it is important to note that not every increase will apply in every situation. The table below shows the estimated ranges of typical kinds of systems under the current rules compared to the new rules. These are examples to illustrate the potential cost increases. It is important to remember that each system is different based on site conditions and every local health jurisdiction my have additional requirements that add to the cost.

Following the table is a set of footnotes that qualify the information presented. Following the footnotes is a description of the different system types. In the table, system types are noted by the number in parenthesis under the cost range figures. This information is provided to give the reader some idea of what system types are being contemplated in the cost ranges.

System and Site Characteristics[1]	Estimated Cost Under Current Rules[2,3,4] (System Type)	Estimated Cost Under Proposal[2,3,4] (System Type)
Basic system 1: (a) type 2 soil with >60 inches vertical separation (b) types 3-6 soils with >36 inches vertical separation	$2,000 - $3,000 (1)	$2,000 - $3,000 (1)
Basic system 2: (a) type 2 soil with 36-60 inches of vertical separation (b) type 3-6 soils with 24-36 inches vertical separation	$3,000 - $4,000 (2)	$3,000 - $4,000 (2)
Moderate system 1: type 2 soil with 24-36 inches vertical separation	$3,000 - $4,000 (2)	$5,000 - $10,000 (7)
Moderate system 2: (a) type 1 soil with >60 inches vertical separation (b) types 2-6 soil with 12-24 inches vertical separation	$5,000 - $10,000 (9)	$5,000 - $10,000 (6) or (7)
Moderate system 1: type 1 soil with 18-60 inches of vertical separation	$5,000 - $10,000 (9)	$5,000 - $10,000 (5)
High system 1: type 1 soil with 12-18 inches of vertical separation	$5,000 - $10,000 (9)	$9,000 - $18,000 (4)
Worst case scenario: typically a marine shoreline repair	$20,000 (8)	$20,000 (4)

[1]Type of system (basic, moderate, high) is based on estimated cost of system under proposed regulations
[2] Except where specifically noted, the costs reflect a system serving a 3-bedroom home
[3]Costs reflect materials, equipment, and installation. Permit and design costs are not included.
[4]Costs vary widely depending on system selected by the designer. The upper end of the range can be greater depending on the final choices of the designer.
System type codes:

1 - Septic tank with gravity SSAS
2 - Septic tank with pressure distribution
3 - Septic tank with pressure distribution and timed dosing
4 - Treatment level A system without chlorination or UV
5 - Treatment level B system without chlorination or UV
6 - Treatment level B system with chlorination or UV
7 - Treatment level C system
8 - Treatment standard 1 system (current rules)
9 - Treatment standard 2 system (current rules)

Appendix B
Sample Cases: Effects of Proposed Changes on Cost

There are hundreds of scenarios that could be developed to help summarize the costs of implementing the changes in these rules. It should be understood that many sites will not incur any additional cost because of the proposed changes to the rules.

Four scenarios are provided, ranging from a simple system to a more complex system on a marginal site. The costs are anticipated based on the given information and reflect the anticipated increase or decrease compared to what is required under current rules. Changes in the given information can dramatically affect the final costs. Also, there are other decisions made by the designer or installer or differences in practice that could affect the cost. One example is in scenario #1 in which the tables show an added cost for the designer addressing sewage quality and developing a record drawing.

Lastly, under each table for each scenario, there is a set of comments intending to provide cost information for different variables. As stated throughout the design and installation section, the effects on cost vary considerably, depending on a number of variables – technology selected, soil depth, etc.. This information attempts to provide an expanded idea of this variability.

<u>Scenario 1</u>: Relatively good soils, simple system and site

Given information

- 3-bedroom home
- 1 acre lot, public water
- Soil type 2
- 10% slope
- 60 inches of vertical separation above water table

Requirement/Allowance	Cost of requirement (compared to current rules) [+ added, - reduced]
▪ Increase in design cost for designer to address sewage quality	+50
▪ Gravity system permitted (pressure distribution required in current rules)	-1,500
▪ Record drawing	+100
Net Cost Increase/Decrease	-1,350

Comments:

- If 72 inches, $1,500 less than current rules
- If 35 inches, added cost of $3,000 to $5,000 to that of current rules
- If less than 24 inches, added cost of $500 to that of current rules

Scenario 2: Relatively good soils

Given information

- 3-bedroom home
- 1/2 acre lot, public water
- Clay loam, strong structure
- 6% slope
- 36 inches of vertical separation above bedrock

Requirement/Allowance	Cost of requirement (compared to current rules) [+ added, - reduced]
▪ Drainfield 50% smaller due to Soil Type 5 (Was Soil Type 6)	-1,000
Net Cost Increase/Decrease	-1,000

Comments:

- If there were just 12-24 inches of vertical separation, there would be approximately a $500 increase as timed dosing would be required. This would result in a net reduction of $500.
- There are no changes in cost due to different treatment levels, regardless of soil depth.

Scenario 3: Coastal site with fine sands

Given information

- 3-bedroom home
- 1/2 acre lot, public water
- Fine sand
- 2% slope
- 23 inches of vertical separation above water table

Requirement/Allowance	Cost of requirement (compared to current rules) [+ added, - reduced]
▪ Drainfield 50% bigger due to Soil Type 4 (Was Soil Type 3)	+1,000
▪ Timed dosing	+500
Net Cost Increase/Decrease	+1,500

Comments:

- If vertical separation was at least 24 inches, the cost for timed dosing will not apply.
- There are no changes in cost due to different treatment levels, regardless of soil depth.

<u>Scenario 4</u>: Site with shallow, coarse soils

Given information

- 3-bedroom home
- 1/2 acre lot, public water
- Type 1 soil
- 4% slope
- 60 inches of vertical separation above water table

Requirement/Allowance	Cost of requirement (compared to current rules) [+ added, - reduced]
▪ Treatment Level A required (Was Treatment Standard 2)	+5,000
▪ Timed dosing	+500
▪ Reduction in drainfield size due to the technology also meeting Treatment Level D	-1,000
▪ Two risers for septic tank needed	+300
Net Cost Increase/Decrease	+4,800

Comments:

- Technologies meeting treatment levels vary depending on options selected by designer
- If 24-59 inches, no additional cost when compared to current rules
- If 60 or more inches, reduction in cost of $1,000 to $2,000 depending on technology selected by designer